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ABSTRACT

This document contains the papers on faculty development from the SITE (Society for Information Technology & Teacher Education) 2001 conference. Topics covered include: a system of faculty development; a faculty development program for medical educators; developing a faculty of education technology integration plan; supporting the development of information technology (IT) skills of education faculty staff; supporting the professional development of preservice and inservice instructors; toward a nurturing, creative learning environment; explorations in online science for middle school teachers; the challenge of developing college-wide technology standards; problem-based learning resources for college/university professors; the instructional, technical, and psychological outcomes of faculty building online courses; teachers as multimedia authors; proactive faculty technology; teachers, technology, and staff development; teaching on the World Wide Web; faculty development of active learning; establishing a technology and learning center; a grass-roots approach to effective technology staff development; the influence of computer-assisted teaching on development of faculty staff members; characteristics of support initiatives to stimulate professional development on information and communications technology (ICT); implementations of videoconferencing in inservice training; smart classrooms led by technology using teachers educators; professorial change through technological collaboration; training tutors online; the evolution of a faculty and staff Web development program; staff development through a turnkey training model; the development of faculty technology competencies; empowerment of personnel to survive in an IT-enabled organization and an e-world; articulating technology needs to administrators and policy makers; a comparison of two models of faculty development; student expectations of distance educators--instructor roles in an interactive televised classroom; organizational learning; summer technology institutes; faculty perception to the integration systems thinking in a teacher preparation program; the faculty retreat as a tool for technology enhancement and team building; technology staff development at an urban public university; justification of technology teacher training from human performance perspective; increasing the use of computers in early childhood teacher education; and the practical use of classroom technology. Most papers contain references. (MES)

FACULTY DEVELOPMENT

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As new communications technologies impact higher education, American education must be transformed to meet the needs of an emerging information society. Attaining this goal will require teachers who meet professional standards. Today's society needs a workforce that can apply knowledge, reason analytically, and solve problems. The faculty must be trained to determine the most appropriate tools for design, support and delivery of courses. The challenge for continuing professional development and renewal to adapt to this changing environment has become critical. The adaptation of existing courses to implement new technologies requires faculty to use recently acquired knowledge and new skills. The standards for teachers supporting these new skills have been developed by the professional organizations governing accreditation in each academic field (NCATE, 2001).

Both the International Society for Technology in Education (ISTE) and the National Council for the Accreditation of Teacher Education (NCATE) have specified the technology skills that teachers are expected to have when they enter the teaching field. These organizational standards provide the foundation for the professional development programs designed for higher education faculty. ISTE suggests that teachers be able to meet these standards: apply tools for enhancing their own professional use and productivity, use technology in communicating, collaborating, conducting research and solving problems, promote legal and ethical use of technology, use technology to support their instruction, and plan the delivery of instructional activities that integrate technology (ISTE, 1998).

The papers included in this section address various approaches available to meet the professional development challenge of these new standards. The papers have been grouped into five areas: 1) Campus Models for Faculty Development, 2) Program Implementation Strategies and Technologies, 3) Online and Other Distance Education Initiatives in Staff Development, 4) Case Studies and Research in Faculty Development, and 5) Pre-Service and PreK-12 Initiatives in Professional Development

Papers included in the Campus Models for Faculty Development section focus on the integration of education and technology. Since a critical part of training is to expose faculty to models of technology use for integration and application of today's technology tools, the models presented in these papers are designed to prepare faculty for the transition from the traditional classroom to the technology rich environment supported by the ISTE and NCATE standards. Bohannon's Course and Faculty Development at Florida Gulf Coast University is designed to promote and support the use of learning-centered teaching practices, the integration of technology into these teaching practices, and the removal of barriers to teaching innovation; thereby, promoting the successful delivery of distance learning. Burrows and Ford describe a faculty development model for the integration of education and technology for medical educators. The skills acquired by the Faculty of Medicine Group will be subsequently transferred to the broader faculty of the University of Manitoba Bannatyne Campus. Laga and Elen outline the characteristics of support initiatives to stimulate professional development on ICT. An analysis is made of these initiatives to detect factors that make them effective and powerful and features are identified that may guide decisions. In another paper centering on empowerment of personnel, Pretorius describes survival skills necessary in an IT-enabled organization and an e-world. The need for personnel to have general and specialized skills appropriate to their specific roles in the enterprise is stressed. Ring and McCallister explore the similarities and differences between two individual technology faculty development programs that have been conducted within the College of Education at the University of Florida. Ziegler, Ziegler, and Burch discuss practical uses of classroom technology. They present a Technology Pyramid model that reviews

the practical application of multiple learning models and the coordination of technology with each learning model.

The second section of papers represents Program Implementation Strategies and Technologies. Successful traditional instructional and evaluative strategies need to be examined and, if necessary, altered to continue their positive effects with students participating in situations with new technologies. These papers highlight activities that are working in our educational system. Frantiska describes the design and development of a workshop to instruct educators on the creation of educational hypermedia via an integrated project. Using the project as the main teaching tool allows for the learning of the new skills with immediate application to an end product. Funderburk and Schullo delineate the current best practices utilized for faculty training, support and professional development. The areas of technology review, training, and computing facilities are intertwined to provide the best possible computing environment in support of instruction and research. Gruber, Rees, and McCormick describe their ACTIVE – Authentic, Competency-based, Technology-enhanced, Integrated, Versatile, and Evaluative – curriculum which addresses the need to improve the preparation of preservice teachers by providing instruction that models the integration of technology into classroom delivery. Hofer discusses the grass roots technology staff development provided at the Teacher Technology Leadership Academy in the Archdiocese of Indianapolis. His model is an effective, train-the-trainer approach that provides research-based staff development in technology for classroom teachers. Poff highlights the evolution of a faculty and staff web development program. Stating that the key to successful implementation of such a program is to deliver the training in such a way as to make faculty want to participate in the training, to make the training relevant, and to encourage continual development once the training has been given. Articulating technology needs to administrators and policy makers is the main emphasis of the paper by Rakes and Rakes. They point out the continuing disconnect involving those who recognize the value and growing needs associated with innovation and administrators and policy makers. Staudt describe three Summer Technology Institutes that were conducted to help faculty develop their technology skills to aid in the improvement of their classroom teaching. The goal of these institutes was to produce quality teachers who are well versed in innovative instruction, skilled in technology usage, and prepared to serve the multicultural and diverse student populations of South Texas.

The third set of papers in this faculty development category centers around Online And Other Distance Education Initiatives. Teaching faculty to effectively communicate their ideas, information, course content, and activities through the Internet, video conferencing, and videotaping is vital in today's educational settings. The JASON Foundation for Education, as described by DeWall, supports a yearlong, multimedia, interdisciplinary program involving students and teachers in real-time science expeditions and interactive curricula linked to the national geography and science standards.

The Academy will offer online science content courses to middle level teaching beginning in Fall, 2001. Ekhaml and Ruskell provide online and print problem-based learning resources for college and university professors to incorporate PBL in their teaching units and to help students work on PBL assignments using these resources. Franklin and Blankson present the investigation of a cohort model in which faculty within a college work together to provide curriculum design and implementation support, online development expertise, shared technology skill improvement, and emotional support for the implementation of online courses. Maki presents the possibilities of videoconferencing in staff development and experiences that developed when teachers participated in interactive lessons instructed via ISDN-videoconference. Suggestions are made for the use of videoconferencing for in-service training and staff development. McVearry and Ehmann describe fundamental challenges that emerge for distance educators in online tutor training programs. Solutions to conquer these challenges are provided. Creating interactive instructional materials using Macromedia's Flash, an interactive session by Uttendorfer, will provide the foundation for hands-on experience for educators. Examples of online web-based lessons created for faculty development workshops are described.

Section Four contains Case Studies and Research in Faculty Development. Chambers and Holbeach describe an Australian case study concerning the supporting and development of IT skills of the education faculty and staff. A range of models of professional development, including individual consultations, group workshops, and paid external training, was offered to participants to assist in developing IT skills. Dutt-Doner, Larson, and Broyles discuss the challenge of developing college wide technology standards. Their case study examines the growing pains of one university's College of Education in designing and implementing technology standards. Gold examines the pedagogical role of the teacher in online education specifically with the transition from traditional classroom instruction to online instruction. The paper focuses on the pedagogical training that an online instructor needs to become an effective teacher. Project New Delhi, a video voyage on the World Wide Web, is presented by Kilbane. This multimedia teaching case study challenges preservice and inservice teachers to learn more about issues and problems in American education by exposing them to case studies about India's educational system. Through the design of video and other materials in the instructional

environment, learners acquired new information and reconsider previous notions about education in this country and others. Chisholm and Wetzel explore the pedagogical beliefs of teacher educator who used technology in their teaching. The study used Smart Classrooms that mirrored the configuration found in many local schools where teachers have a limited number of computers. Schmertzing and Schmertzing present a study on the students' expectations of distance educators and the instructor roles in an interactive televised classroom. This ethnographic study of graduate education students suggests that students assigned new responsibilities to the instructor and expected the instructor to bridge the distance gap between the classrooms, clarify new rules for classroom behavior, and maintain a focus on course content despite the added technology related duties of the instructor. Solberg presents several case studies concerned with organizational learning and the venue for institutional change with online technologies. She presents a model for linking individual change to organization change. Tucker, deMontes, Willis, and Blocher describe a study of faculty perceptions to the integration of systems thinking in the teacher preparation program at Northern Arizona University. The study reports on how open faculty would be to professional development designed to better prepare them to incorporate systems thinking into their teacher preparation courses. Varnak and Tozoglu investigate the idea that technology teacher training is the only solution to improve teachers' performance in using technology in the classroom.

The last set of papers involves Pre-service and PreK-12 Initiatives. The technology environment that is developing throughout the world is causing an impact on the teaching and learning of the preservice and inservice elementary, middle, and high school teachers. Programs are being conducted to insure the professional development opportunities for these educators. Crawford and Edwards focus on the aspects of a nurturing, creative learning environment for preservice and inservice instructors, including instructional design models that promote self efficacy in technology integration, types of learning activities that work best with educators, and strategies to help implement technology integration and foster a sense of life-long learning. Giordano plans for sustained change by describing an instructional design model for teacher staff development to train teachers to integrate the Internet into their classroom routine. The paper describes the model, discusses the specific elements of the course design and its theoretical foundation, and offers examples of course elements to illustrate the pedagogy. Lundy, Sheldon, Rastauskas, and Woodell outline a framework for transforming technology integration with a public school system from isolated success stories to a district-wide movement. The program encourages educators to become leaders in their own development by taking advantage of outline resources that encourage mentoring and collaboration. Professorial change through technological collaboration is encouraged by the grant described by McGaughey, Radigan, Searle, and Smith. University professors model appropriate use of technology to help pre-service teachers acquire proficiency in the use of technology for curricular purposes. Polney, Squiciarini, and Walter document the key ideas and themes of a staff development trainer model and its applications and benefits with a school district, highlighting the administrative role of the model. Obstacles, challenges, and strengths of implementing technology into a school district are noted.

This collection of Faculty Development papers describe effective initiatives and innovative models that have been designed and conducted to improve the use and integration of technology at institutions of higher education and PreK-12 educational settings worldwide. Taken as a group, the methods and models provided will aid in the effective training of faculty and will address the critical need for continuing professional development and renewal to adapt to our changing technological environment.

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Course and Faculty Development at Florida Gulf Coast University

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Abstract

The goal of Course and Faculty Development at Florida Gulf Coast University is to support the use of learning-centered teaching practices, integration of technology, and delivery of distance learning by removing barriers. As one of three interdependent support units, Course and faculty development has contributed to the university-wide support system that allows faculty to achieve these goals. This model of faculty development uses ten distinct service strategies to accommodate the needs of a diverse, multicultural faculty. Having ten ways to access support allows faculty to engage in

As a result, during the first three years of operation 71% of the full-time faculty participated in one or more faculty development projects or activities, and 24% participated in six or more. The staff has contributed to the design of 113 web-based or web-enhanced courses, and over 65% of the full-time faculty report that they use the key technology tools for teaching and learning.

Description

In the fall of 1997, Florida Gulf Coast University (FGCU) was born into the technology revolution that has been transforming higher education in this country and abroad. As a new undergraduate teaching institution in the Florida State University System its mission stated that teaching and learning would be characterized by 1) the use of learning-centered teaching practices, 2) the integration of instructional technology, and 3) the delivery of twenty-five percent of its courses through distance learning. These instructional strategies represented a significant departure from traditional teaching practices, but were necessary if FGCU were going to enhance and expand learning opportunities for a burgeoning population of traditional and non-traditional students in Southwest Florida and beyond (Appendix A).

In response to this challenge, the University established the Office of Instructional Technology (IT), a faculty support system. The organizational structure of the Division of Instructional Technology was guided by the premise that the primary barriers to using technology for teaching and learning must be mitigated by a comprehensive faculty support and development system. Toward this end three interdependent units were established: Technology User Support, Multimedia Design Services, and Course and Faculty Development Services. This structure supports a faculty development initiative that is part of a university-wide system of high expectations, state-of-the-art infrastructure, college/university incentives, and comprehensive support services for students, faculty, and staff

The faculty development program is based on the belief that the majority of faculty members are <u>not</u> reluctant to explore teaching innovations, as the conventional wisdom suggests, but that there are barriers that prevent their best efforts to do so. We believe that systemic barriers demand a systemic solution. Therefore, it is necessary to describe the faculty development program at FGCU in the broader context of Instructional Technology. The interdependencies among Technology User Support, Multimedia Development Services, and Course and Faculty Development Services create an instructional environment where it is possible to achieve

the goals of excellence in undergraduate teaching, and many faculty members report that doing so has been one of the most satisfying experiences of their careers.

Faculty development, as traditionally defined, is essential, but insufficient, as an intervention to meet the goals set forth in our mission. A faculty member with highly developed technical and pedagogical skill cannot deploy a brilliantly designed course if there is no equipment available, if he/she must spend hours each week providing technical as well as academic support to students, if there is no incentive in the personnel review process to acknowledge teaching innovation, and no alignment with institutional priorities. Therefore, "faculty development" has come to mean many things at FGCU. It means the traditional activities such as the skill development workshops, presentations by outside experts, and discussion seminars which are common on most campuses, but it also means individual consultations to solve an instructional problem, collaboration with an instructional design team to create or redesign a course, participation in a formative classroom peer coaching program, taking a self-paced software tutorial online, or requesting a house call. Each of these services promotes the faculty development agenda at FGCU while simultaneously removing barriers that hinder faculty progress. (Appendix B)

The first barrier to using technology is the difficulty of acquiring necessary classroom equipment. This barrier has been addressed at FGCU by equipping all classrooms with electronic teaching podiums that include a computer, document camera, VCR, ceiling-mounted color projector, speakers, jacks for peripheral equipment, telephone, and a control panel that allows faculty to move seamlessly from one form of media to another during the course of a class. When classroom activities are designed using audio, video and multimedia, the faculty members know that the equipment necessary to use those materials will be waiting for them. They also know that a phone call to tech support will have a staff member in the classroom within minutes if some part of that equipment malfunctions.

The second barrier to the use of technology is the need for a faculty member to master many specialized skill sets. These skill sets include knowledge of current instructional technology, application of instructional design theories, programming, multimedia development techniques, graphic design, and web development. This barrier has been addressed at FGCU by providing a staff of instructional designers, programmers, multimedia developers, graphic artists, and web developers who are members of ad hoc development teams that work with faculty in designing and implementing their course development projects. As subject matter experts on these teams faculty members not only produce technology-enhanced courses, but learn to be independent managers of those courses in the process. When faculty members engage in a course development project, they are simultaneously producing a new or redesigned course while learning about the pedagogy and uses of technology that are then incorporated in their course designs. The development team continues the consultation and coaching support for faculty until their services are no longer needed, and the faculty member has become an independent manager of the new course.

The third technology user barrier is "being new on campus". The first months of any job involve discovering "how things get done around here", but new faculty at FGCU must master a long list of digital tools in order to teach in classrooms and even to communicate. Easy and swift access to technology support services is provided by IT staff who serve as liaisons to new faculty, conducting personal conferences to discuss problems and to make connections with the appropriate services on campus to meet immediate teaching needs. This service complements the two days of group technology and pedagogy training that are offered as part of orientation sessions.

The fourth barrier to instructional innovation is the problem of limited time, schedule inflexibility, and learning style preferences. The Course and Faculty Development unit recognized that reliance on group training was insufficient to meet the needs of the diverse faculty in the five colleges at FGCU. The 187 full-time teaching faculty members represent the broadest spectrum of technological skill levels, knowledge of learning theory, and experience in technology integration and distance learning. Therefore, 10 strategies have been adopted for providing faculty development support to accommodate the time constraints and to match faculty with development opportunities that capitalize on their diverse learning styles. The ten strategies are organized in three categories: 1) Group Strategies - skill development workshops, topic centered study groups, faculty led sharing seminars; 2) Individualized Strategies - course development teams, instructional design consultations,

house calls, peer coaching; and 3) Web-based Strategies - online tutorials, online faculty orientation (in development 2000-01), and user group facilitation

This means that a faculty member who wants to develop cooperative learning activities for a class could attend a 3-day workshop, or schedule a one-hour consultation with an instructional designer, or read the online articles, or enroll in an online instructor-led or self-paced tutorial, or lead a course development team in the design of cooperative learning activities, and/or participate in a peer coaching project to have a colleague observe and give feedback on use of a cooperative learning activity. This faculty development structure is intended to accommodate the diverse, multicultural characteristics of the faculty and provide a model of the many instructional options that help diverse learners succeed.

Once the organizational goals were established and the barriers were identified, a survey of the newly hired faculty was conducted to determine their needs. The Faculty Development Advisory Council was convened by the Director of Course and Faculty Development to review the survey results and refine the initial faculty development plan. The members of the council serve as liaisons between the colleges and IT, and participate in the annual planning process. The survey results indicated that there was a large core of faculty with a strong desire to achieve the goal of excellence in undergraduate teaching. Some members of the faculty came to FGCU expressly to focus on teaching and learning as they had been unable to do so in their former institutions where the pressure to publish and procure grants dominated their time. In addition, many students had come to FGCU to be part of this educational experiment and to learn in new ways. The natural synergy of desire and opportunity among faculty and students became the engine for innovation that the legislature envisioned, and resulted in a spirit of entrepreneurship that is seldom seen in bureaucratic organizations. Conversely, that same core of faculty had widely varying levels of technical skill, and ability to apply learning theories. This wide variation mandated that one size would definitely not fit all, but that the model for faculty development would have to be customized to accommodate the wide variety in faculty skill and background. This provided the opportunity to model the instructional principles we were promoting.

The Course and Faculty Development staff consists of a director, three instructional designers and a part-time student worker. The instructional designers serve as project managers of ad hoc course development teams, conduct group training, design online training, conduct consultations, evaluate software products, and produce instructional materials. These teams enlist the services of Media Development as needed. Last year IT merged with Broadcast Services to become a single organizational entity on campus. This relationship provides closer working relationships with WGCU-TV, the local Public Broadcasting System affiliate and WGCU-FM the National Public Radio station, which are both housed in the same facility as IT.

During the first three years of operation seventy-one percent (71%) of the full-time faculty participated in at least one course and faculty development activity or project. Twenty-four percent of the full-time faculty participated in six or more activities or projects. The instructional design staff has served as project managers and designers on 113 course development projects. Many of these courses have been developed for distance delivery, and others are campus-based courses that have technology-enhanced components.

After two years of operation FGCU completed a self-study in preparation for a visiting committee from the Southern Association of Colleges and Schools. The yearlong review of all campus operations involved over one hundred committee members and the collection of survey data from students, faculty, staff and community. Full accreditation was granted in May 1999, and the visiting committee included eight commendations, a record-setting number, in their report. Two of the eight commendations highlighted the effectiveness of the instructional technology support system.

> "The committee commends the university for its provision of state-of-the-art information technology in the classroom, and the Office of Instructional Technology for its success in assisting the faculty to make good use of this equipment."
>
> "The committee commends the university for the extent that it has infused information technology into the curricula, and prepared students to use these resources in everyday life and in future occupations."

At the end of three years 100% of the faculty responding to a survey indicated that they used the Internet as a resource for teaching and research and used email for instructional communication. Ninety-three percent use the classroom podiums routinely and create classroom materials with presentation software. Eighty-five percent regularly use the electronic databases that are part of the library collection. More than 50% of the faculty use synchronous collaboration tools or electronic bulletin boards to post and discuss assignment with students, use scanners to create graphic files for class presentations, and use a course web site as the primary construct for a distance learning course or as an enhancement for a campus-based course. More than 25% of the faculty are using digital or video cameras to collect materials for instruction, conducting class in a videoconferencing facility, or using online testing software.

In a student survey administered as part of the accreditation process 85% of the students felt that the instructional technology used in courses contributed to learning, 92% agreed that adequate technology was available to support teaching and learning, 89% agreed that FGCU had created an environment conducive to learning, and 71% agreed that distance learning was an effective alternative to traditional instruction. In the summer of 1999 a survey of all distance learning students showed that 86% of the students would take another distance learning course.

FGCU has been a living laboratory for teaching with technology during the past three years and much has been learned about using these powerful tools effectively. During the summer of 1999 a team of faculty and staff were assembled to identify a set of *Design Principles for Online Instruction.* The team included instructional designers, faculty who had been teaching online and web-enhanced courses and staff members from Instructional Technology. The team reviewed the literature, reflected on their teaching experiences, crafted a framework, and agreed upon a set of principles for – instructional design, multimedia design, management of online courses, academic and technical support systems. The resulting document became the basis for a series of faculty seminars on campus and presentations at state and national conferences. The University of Guadalajara and the College of Nursing at the University of Louisiana-Lafayette have both used these principles in their faculty development programs during the last year.

It seems impossible that only three years have passed since FGCU faced the challenge of taming the technology tiger and during that time more and more campuses have joined the effort. Like the railways and steel mills of the industrial revolution, technology has become a part of our way of life, and learning to harness its power requires both vision and endurance. At FGCU much progress has been made and yet, we have just begun.

Appendix A

F.G.C.U. Vision, Purpose, and Commitment

Vision and Institutional Purpose

Florida Gulf Coast University is dedicated to providing a learning-centered environment that offers the highest quality educational opportunities for the development of the knowledge, insights, competencies, and skills necessary for success in life and work. To maintain this learning-centered environment, the university as a whole and its units and individuals will actively practice continuous planning and assessment leading to improvement and renewal.

Florida Gulf Coast University is a comprehensive* public university created to address the educational needs of the rapidly growing Southwest Florida population and the increasing number of students who are seeking admittance into the State University System. The university's primary service area consists of Charlotte, Collier, Glades, Hendry, and Lee counties, with specialized programs drawing students from the state and beyond.

The university offers a broad range of undergraduate and graduate areas of study including arts and sciences, business, technology, education, environmental science, nursing/allied health, and public and social services. Professional development and continuing education programs are offered based on need and availability of resources. On-campus offerings along with distance education and partnerships with public and private organizations, agencies, and educational institutions enable the university to extend a rich diversity of higher education opportunities to Southwest Florida and beyond.

The university seeks to employ innovative ideas and technologies in the development and delivery of programs and services. The university also pursues regional and community-based public service activities and projects. To support the roles of teaching and public service, faculty and students are encouraged to engage in a wide array of creative inquiry and scholarship, including applied scholarship that focuses on the unique Southwest Florida environment and other issues of importance to the region and state. The library, which utilizes information technology in the delivery of instruction and information resources, actively promotes student learning and supports the information needs of the university.

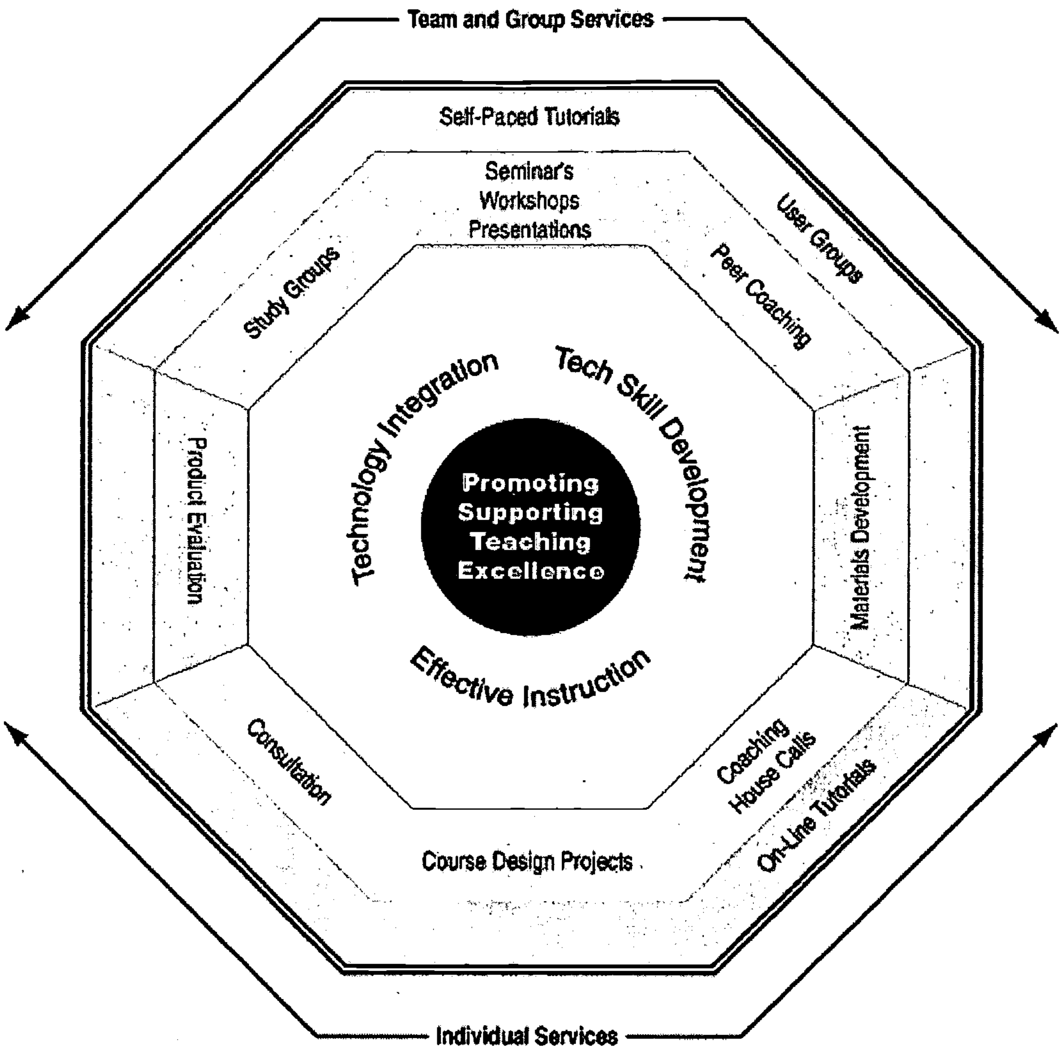
Institutional Commitment

Florida Gulf Coast University promotes an institutional culture that:

- Fosters the pursuit of truth and knowledge;
- Affirms academic freedom as the foundation for the transmission and advancement of knowledge;
- Seeks excellence in both educational offerings and services;
- Asserts that learner needs, rather than institutional preferences, should guide decisions concerning academic planning, policies and programs;
- Provides academic, student, and administrative support services designed to meet the needs of the university community;
- Recognizes, encourages and rewards quality teaching;
- Enhances the growth of faculty by supporting teaching, scholarship, service and professional development;
- Encourages collaboration in learning, governance, operations, and planning;
- Establishes mentor/advisor programs, particularly programs for undergraduates that include senior capstone projects or papers;
- Recognizes that informed and engaged citizens are essential to the creation of a civil and sustainable society; and
- Affirms that diversity is a source of renewal and vitality.

*Carnegie Foundation classification

Appendix B



Faculty Development Model

Florida Gulf Coast University

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Education and Technology – A Faculty Development Program for Medical Educators

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Abstract: A faculty development model for the integration of education and technology was designed and implemented to enhance teaching and learning. There is a great need to assist and provide support to medical faculty who wish to integrate technology into the learning environment. A consortium was formed of the key stakeholders. The educational framework for the Education and Technology Workshop was the Seven Principles for Good Practice in Undergraduate Education (Chickering and Gamson, 1987). Experiential learning theory provided the framework for understanding how technology can be integrated with the principles of teaching and learning (Kolb, 1994, 1971). We will discuss the successes and failures of this model and supply some reflection on future interventions and support strategies.

Introduction

There is a great need to assist and provide support to medical teachers who want to integrate technology into the learning environment. Attendance at the 2000 SITE conference by one of the authors was the impetus for the program. A consortium of key technology stakeholders was organized. Professional development teachers were recruited from the Continuing Medical Education department. A key person to involve in the project was an Academic Computing and Networking instructor who had assisted with other projects. A representative from library services was included, as was a representative from Education Support Services. Supports for integration of computer technology into the classroom, assisting teachers with connections, video projections and trouble shooting was critical to the success of the program.

Program Model

The desired outcome of the program was that the participants be able to use technology in a way that enhanced the understanding of the subject area, without compromising student-centered strategies that actively involved students in the learning process. Technology used without pedagogical consideration thrusts the learner back into a passive role. The program developers chose to use the "Seven Principles for Good Practice in Undergraduate Education" (Chickering and Gamson, 1987) as the framework for the program to underscore the desired outcome. Good practice principles encourage: student-faculty contact; cooperation among students; active learning; prompt feedback; time on task; high expectations; and respect for diverse talents and ways of learning. The program focused primarily on the what, when and why of using technology appropriately and effectively, and secondarily on the how of using technology. Kolb's four-stage cycle of learning theory (1994, 1971) was used as the structure to sequence the program. The four stages are immediate concrete learning experience, followed by observation and reflection, leading to abstract conceptualization and finally active experimentation. In our program a concrete learning experience with technology was the basis for the participant to make observations about their practice and to reflect on them. Adjunct self-directed web based training was available to participants, as was access to student mentors. The observations were made through self evaluation and peer evaluation of a micro-presentation on the final day of the program. These observations or evaluations provided the motivation for the participant to develop ideas for future practice, thereby creating a new experience. The program offered participants direct experience and

reflective observation using PowerPoint software in an environment that required them to follow principles of effective practice. The focal point or deliverable of the program was a micro-presentation by the participant, on the second day of the program, that was self and peer evaluated for appropriate use of technology that enhanced understanding of the subject area.

Delivery

The first step was to recruit six trainers though a screening process that examined their previous experience with professional development and their level of technological competence. The selected trainers had to agree to conduct one two-day workshop annually for the medical faculty. They then attended a sixteen-hour, three-part program, sequenced over a one-month period, allowing time for preparation and reflection. Student mentors were available to assist participants with their micro-presentation preparation. The second step was the delivery of two faculty wide education and technology workshops. Participants were selected from a variety of health science departments. A condition of acceptance into the workshop was that they have basic technology skills, be present for the full workshop program and agree to be an education-technology resource within their home departments. The program developers acted as on-site resources during the first workshops the trainers conducted.

Outcomes

This faculty development model worked. Involving key players from various departments in the consortium contributed to the success of the program. Both trainers and workshop participants consider pedagogical principles when using technology. Six trainers were prepared and their abilities exceeded the program developers' expectations in terms of integration of technology for enhanced understanding while using good educational practices. The micro-presentations, self and peer evaluations were both positive and constructive. The participants evaluated the program very highly. The trainers facilitated two workshops for eighteen medical teachers who became departmental resources for education and technology. Our goal is to deliver additional workshops in 2001 to advance the appropriate use of technology within good educational practice.

Reflection – What Have We Learned

Technology must enhance learning not distract from it. Faculty development programs must focus on pedagogical considerations rather than on the technology itself. The micro-presentation is a critical element in the program because it forces participants to practice what they have learned. The financial resources available to train faculty is limited and this faculty development model is a low cost, self-perpetuating delivery method.

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Developing a Faculty of Education Technology Integration Plan: Initial Stages of a Large Scale Faculty Professional Development Program

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There is a strong consensus among many educators that the teaching of technology should be incorporated across the curriculum at the earliest levels of education (Logan, 1995). Although Faculties of Education tend to realize the importance of technology, they have been slow to respond to the needs of the field (Barksdale, 1996). Thus schools have been forced to compensate for this lack of leadership by developing their own in-service technology programs for teachers. There are a number of reasons why Faculties of Education have been slow to respond to the impact of technology. First, many faculty members require extensive professional development in the area of technology integration so that they can model appropriate uses of technology (Rogers, 2000). Second, faculty professional development programs must be designed so that these programs fit into a Faculty's overall Technology Integration Plan (TIP)—the development of a Faculty TIP is a difficult process, especially given the complex political nature of any university environment. Finally, regardless of the TIP, each Faculty must find the resources to carry out the action items defined in the TIP in order to achieve the goals of the TIP. This paper will describe the University of Alberta's Faculty of Education TIP and its importance in a comprehensive effort to foster Faculty Professional Development. It will also discuss a newly funded research study of our 120 faculty members with respect to technology integration for teaching, learning, and research.

The University of Alberta has an enrollment of 29,000 fulltime students. The number of students in the Faculty of Education consists of approximately 3,000 undergraduate students and 1,000 graduate students. The teaching staff consists of just over 100 fulltime faculty members and 200 part-time and full-time sessional instructors. The Faculty of Education has enjoyed a long history of integrating technology into teaching, learning and research, beginning in the mid-1960's. Currently the Faculty of Education runs a fairly elaborate computer network that uses 13 computers as servers (3 Sun computers, 4 NT computers and 6 Macintosh servers). The five student computer laboratories contain approximately 125 computers and over 100 classrooms have been wired with Category 5E Ethernet cable.

A good TIP needs to make provision for both long-term and short-term goals. In a very real sense, a technology integration plan is an evolving document, which is inclusive and flexible enough to enable quick changes based upon rapid changes in the technological world and, yet, specific enough to provide direction for immediate action. It also reflects the reality that, as faculty members in a professional faculty, we not only need to integrate technology into our own work, but, in turn, need to prepare our students to integrate technology into their work in schools and libraries. The following vision statement reflects our Faculty's long term commitment to technology integration.

Vision Statement: The Faculty of Education will foster an educational environment where technology is an integral part of the teaching and learning process, research and

administration. In this environment, technology will be part of the everyday practice of how students learn, how faculty members teach, do research, and communicate with the field, and how administrative services facilitate activities within the Faculty.

Goals: Goal statements in the TIP are organized under three major headings—the teaching and learning process, research, and administration. Optimizing the teaching and learning process through technology integration is crucial to attracting and satisfying outstanding undergraduate and graduate students, as well as meeting the technology goals of the Alberta Government's Department of Learning and local school districts, and the professional development needs of teachers, librarians, and other professionals. The research process is being transformed in all areas of educational research as faculty and graduate students make increasing use of information and communications technology. In addition, technology is becoming a focus of research as researchers investigate the impact of technology on the teaching and learning process and the use of digital information and multi-media technologies in course delivery. In relation to administration, the Faculty of Education is actively supporting the implementation of a new PeopleSoft-based administrative information system at the University of Alberta, as well as developing new programs to meet its own specific needs.

The significance of adequate human and technological resources permeates the goals in each of these areas. These resources are essential to optimize the teaching and learning process, research excellence, and administrative efficiency. These resources are also crucial in order to attract and retain high quality personnel in the Faculty of Education and to ensure that the Faculty is able to demonstrate leadership and respond to the communities we serve.

1. *Teaching and learning process*: The Faculty of Education is responsible for the education of teachers, administrators, librarians, counselors, and other educational professionals. As educators, we are constantly searching for more effective ways to optimize the teaching and learning process. Used appropriately, technology has the potential to increase the quality, efficiency, and accessibility of our programs. We also have a responsibility to prepare teachers for Alberta's schools. The Alberta Department of Learning has explicitly stated that information technology must be "integrated into education to enhance student learning, and increase efficiency and flexibility of delivery." The Alberta School Act requires that pre-service graduates of our programs be able to demonstrate that they understand the functions of traditional and electronic teaching/learning technologies, and that they know how to use and engage students in using these technologies. The implementation date for Alberta Learning's new Technology Program of Studies is the year 2000. Hence, we need to provide both pre-service and practicing teachers with knowledge of computer technology and of methods of integrating computer technology into the curriculum.

A major goal of the Faculty of Education is to integrate information and communications technology across the curriculum in order to optimize the teaching and learning process in courses offered both on-campus and through alternative delivery. As well, the goal is to optimize the learning environments in schools and in the services and operations of libraries and information agencies.

2. *Research*: A second major goal of the Faculty's TIP is to integrate technology into the ongoing research processes in the Faculty. This should enable professors in the Faculty to undertake and conduct world-class research programs and, thereby, meet future research needs and requirements.

3. *Administration*: The third major goal of the Faculty of Education is the integration of technology to optimize efficiency and effectiveness of our administrative services.

To achieve these TIP goals the Faculty of Education has embarked on an ambitious professional development program. The first phase of the program is an extensive needs assessment of Faculty members. It was felt that for faculty professional development of technology integration to succeed we needed to hear the concerns of all faculty members not just the select group of early adapters. An interview questionnaire was created and three interviewers (Ph.D. students) were trained on the administration of the questionnaire. All 120 Education faculty members were contacted and 92 of these were interviewed (on average 1 hour). Data was collected in the form of interviewer notes and tape recorded sessions. These interviews were completed over a four month time frame (May 2000 – August 2000). The data collected from these interviews is now being analyzed. A cursory analysis of the data indicates the following:

1. Faculty members have specific learner outcomes that can only be achieved by a highly individualized program. This will require both individualized support and instructional materials for a very specific set of learner outcomes.

2. Faculty members generally share common learner outcomes with colleagues who closely work in their areas of teaching, learning, and research. This should result in naturally occurring groups of colleagues who share a common set of learning outcomes.

3. Faculty members share common learner outcomes with other faculty members in the Faculty of Education. Groups of faculty members from across the Faculty with common learner outcomes can be addressed on a faculty-wide basis.

4. Faculty members may share common learner outcomes with other faculty members throughout the University. In this case, we would work closely with university wide units (e.g., University Teaching Services, or Academic Technologies for Learning) to develop more general sets of learner outcomes.

The preliminary results also demonstrate that Faculty members require a "just-in-time need-to-know" support structure that can efficiently and effectively meet: a) technical infrastructure support requirement, i.e., hardware and system software; and b) technology integration support with respect to teaching, learning, research, and administration.

Our goal for the coming months will be to thoroughly analyze the interview data. Following from this data analysis process we intend to develop a program of professional development that is "context sensitive" to the needs of our academic environment.

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Supporting the Development of IT Skills of Education Faculty Staff: An Australian Case Study

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Abstract

This paper will explore the ways one Faculty of Education has approached the challenge of increasing the uses, in particular the more advanced uses, of information technology (IT) to support teaching through the professional development (PD) of staff. A range of models of professional development (such as individual consultations, group workshops, paying to attend external training) was offered to staff to assist in developing IT skills. The uptake of these different PD models is investigated, and the staff members' perceptions of the development of IT skills, and the preferred PD models for developing IT skills are explored.

Introduction

Over the past decade at the University of Melbourne, Victoria, Australia, there has been strong support, both financial and more generally, for increasing the uses of information technology (IT) and multimedia in undergraduate and postgraduate teaching and in other aspects of academic life. This support has been expressed through generous funding for the development of multimedia resources to support teaching and learning. For example, between 1996 and mid-2000 almost AUD$10 million of university central funds were invested in development and implementation of IT and multimedia projects (Alcorn 2000) and substantial further funding for multimedia developments and for the inclusion of IT in teaching was also provided by faculties of the university. This has impacted on all faculties of the university, including the Faculty of Education, and inclusion of IT is a routine aspect of the daily lives of academics and, for many, a routine part of their teaching. Despite this strong emphasis on the uses of IT over the past decade, there are still some staff in the Faculty of Education (and no doubt in other faculties!) for whom using IT as a regular aspect of their teaching is a challenge from which they have shied away.
The University of Melbourne is the second oldest university in Australia with total enrolments of approximately 30,000 students, with almost 4,000 students enrolled with the Faculty of Education in 2000. Degrees awarded in the Faculty of Education include undergraduate coursework degrees through to research Ph.D. and D.Ed. degrees. There are approximately 100 academic staff and about 80 general staff (mainly administrative) in the Faculty. In 2000 the position of 'Assistant Dean (Information Technology)' was created within the Faculty with a brief that included (among many other things) 'identifying staff IT training needs and developing a strategy for meeting them'. A number of the papers presented in the 'Faculty Development' stream at SITE2000 (*e.g.*, Beiser 2000, Kahn & Pred 2000) explored how similar needs had been addressed at other institutions and the experiences related in these papers informed how IT Professional Development was planned for 2000. This paper will explore how this challenge was taken up and the success of some of the strategies applied to assist and encourage staff of the Faculty to use IT in their academic lives.

Some Models of Professional Development

Professional Development (PD) has historically been developed under two guiding principles - effectiveness and cost. The models of PD that have developed are, in some way or another, a trade-off between these two

principles. For instance, web-based PD has the advantage of being cheap to develop (write once, read anywhere, many times), but depends on self-directed learning (Shotsberger 1997) and may therefore not be very effective across a faculty. One on one mentoring, on the other hand, has a high rate of user approval, but is seen to be expensive.

Perhaps the most traditional form of IT Professional Development (IT PD) is the technology workshop, in which a skilled user and teacher imparts knowledge to a group through a mixture of verbal tuition and hands-on examples. Workshop models of PD have the advantage of meeting many users' needs at the same time, and are most successful when carefully targeted to groups with the same, or similar, skill levels and goals. There is, however, the problem of attenuation of learning between the workshop and the time of implementation (Guskey 1986). The workshop model thus needs to be supported by other models of PD, such as Just-in-Time support, or on-line materials.

Ohio State University recognized this in a report of July 1999 by their 'Faculty Instructional Technology Development Committee' (Ohio State University 1999). The report approached the issue of choosing appropriate models of PD for their faculty from a temporal viewpoint. They noted that the need for PD arises when faculty staff have:

- An urgent need for help ("How do I make my computer open PDF files"?).
- A need for help just in time to do a project/course/presentation ("How can I turn these notes in a PowerPoint presentation?").
- A need for long-range planning that involves new technologies ("I need to develop on-line materials to support my students").

To support these three separate time frames, they concluded that the implementation of a number of different PD models was necessary. Some examples of the models that they chose to use are shown below:

Urgent Need

- Students trained to be first level of support, with technical assistance from professional staff.
- Central help desk for common applications.

Just-in-Time

- Student mentors who organize PD sessions with staff for specific problems.
- Team members for on-going PD in specific projects.

Long Range

- Workshops on specific IT issues.
- Consultants to talk one-on-one with staff about issues such as teaching strategies of pedagogy.

In many universities only the urgent and long-range needs have been met — the former through a help desk to respond to technical problems, and the latter through workshops and seminars. This leaves a significant gap in the Professional Development program of a faculty that wishes to move forward in using IT in teaching and learning. In a discussion forum held by the Victorian Professional Development network, Terry Harrington (who runs an Australian Professional Development program with 15,000 enrolments) stated that teachers generally wanted Professional Development that was:

- engaging
- readily applicable
- no longer than it has to be, but not a one off event (Zbar 1999).

These needs appear to apply equally to staff at higher education institutions. The need for a Just-in-Time professional development model is behind much of the 'mentoring' models of PD. The mentors may be students, peers or experts, and respond to their mentee's specific needs by organising meetings with them in which the mentee's individual PD requirements are met. A US study in 1995 attributed the success of a technology mentor program to the individualized nature of the professional development - a self-paced workload focusing on the specific needs of the faculty member (Zachariades & Roberts 1995).

Models of professional development offered to staff at the Faculty of Education during 2000

After attending SITE2000 and further reading on the matter of IT PD for faculty members the following models of professional development (PD) about using IT were offered to staff of the Faculty of Education.

Group IT PD workshops

Areas of need for many staff were identified and workshops were offered by the IT PD Coordinator and attendance invited.

Individual IT PD consultations (one-to-one 'Just in Time' [JIT] PD)

Staff members telephoned or emailed in a request for help with either a specific need or with a request for developing skills with a certain product or goal. The IT PD coordinator would then visit the staff member in their office for a consultation.

Small group IT PD consultations

After staff had identified a common need they organized themselves into a small group (two or three individuals) and PD to meet their needs would be developed for them. This generally happened where staff members were working on a project together.

Technology Mentors

Academic staff (volunteers) were paired with technically able students (volunteers) and in ten meetings over approximately 12 weeks the technology mentor (student) identified the IT PD needs of the staff member, developed an IT PD plan, and gave individual tuition to the staff member on these identified areas. The technology mentors were supported in technical areas where required and were provided guidance and support in dealing with material they were not familiar with by the IT PD Coordinator.

External IT PD

Staff were invited to request IT PD at whatever level they required and if the PD required was beyond the skills of the IT PD coordinator, or was not offered by the university's Information Technology Service it could be met by an external consultant or by attending an external course. (This would be funded by faculty funds.)

It is interesting to note that there was no demand for 'External IT PD', that is for professional development courses offered outside the Faculty or university. It is likely that in the busy lives of faculty members that if PD is not readily available and close at hand then it does not occur. This style of PD will thus not be discussed further.

No charge was made to the staff or to their department for using any of these services (all costs were funded at the faculty level) and as demand increased the staffing providing PD was increased to meet the demands. No ceiling was placed on the PD available to any staff member or department.

Uptake and Perceptions of IT Professional Development Opportunities

The goal that over half of the staff of the Faculty would undertake IT PD during 2000 was met, which was very pleasing. There was a higher proportion of academic staff who took the opportunity for IT PD than general staff. This was probably a reflection of the topics covered by the large group IT PD workshops, these focussed on developing and maintaining web sites, which is of greater interest to teaching staff than administrative staff. The uptake of IT PD was uneven across the Faculty, with one department in particular not being well represented. These two issues will be addressed in 2001 by targeting more IT PD sessions for topics of interest to administrative staff and specifically targeting the staff of the department that was underrepresented in 2000.

All staff surveyed that had made use of IT PD opportunities in the Faculty in 2000 stated that their IT skills had been enhanced during the year and all were 'satisfied' (28%) or 'very satisfied' (72%) with the IT PD that they had experienced. Some staff (6) that responded to the survey had not accessed any of the IT PD offered and of these only two felt that their IT skills had been enhanced during 2000. Encouraging staff to access the IT PD available to them will be a key goal in 2001.

Staff were asked to rank in order of their preference the different models of IT PD offered during the year. Only one staff member rated group IT PD workshops as their preferred model of IT PD, with the most popular model (60%) being one-to-one PD (where the staff member was visited in their office). Small group and technology mentors were ranked about equal, each IT PD model scoring approximately 20% as the first preference of staff. That the individualized one-to-one 'home delivered' model of IT PD was preferred is not surprising. The needs of staff were met through these customized sessions that were very convenient (as the time and location was

determined by the staff member) and very time efficient (as the materials covered were tailored to meet the needs of the individual).

Group IT PD classes

Scheduled large group (approximately 15-20 people) workshops about developing and maintaining web sites were attended by over 50 staff members (mainly academics) and this proved to be a very useful model of *initial* PD for an IT topic that was of interest to many people. Staff who attended the group workshop were then emailed to see if they would like a demonstration version of the software installed on their desktop computer. Where this was requested, the software was installed and at this time further PD was offered on a one-to-one basis to suit the needs and goals of the individual. Staff who had the demonstration version of the software installed on their desktop computer were contacted three weeks later to see if they would like a full (licensed) copy of the software installed. This again allowed staff who wished to develop these skills to have further one-to-one PD. This approach of large group workshops followed up with one-to-one IT PD meant that many staff who attended the group workshop could further develop those specific skills they required in the one-to-one PD sessions that followed. One comment about this was:

> *'I believe my skills level was above the group level (when I started Dreamweaver) and in a one-on-one I was able to improve my skills where needed at the appropriate time.'*

Individual IT PD consultations

In addition to individual consultations that were 'follow ups' to group PD, many staff requested individual consultations about other areas in which they wanted to develop IT skills. This model of PD was very popular with staff and all staff who utilized it rated it as either 'useful' or 'very useful'. Some comments about this model of PD included:

> *'The one on one really is best particularly with academic staff who have a vast range of skill levels, and also for the more advanced admin. staff who have previously had little access to someone who knows programs better than they do.'*

> *'My preference is for small groups or one-on-one PD. For technology PD that is related to my job, I generally have specific questions about particular software applications. I only use a few applications that I am unfamiliar with, so my questions are usually related to particular aspects of programs. These questions may not be relevant to other people. Also, it enables the possibility of asking follow-up questions or for clarification.'*

Another positive feature of the one-to-one IT PD model is that it is very time efficient. Some comments about this included:

> *'It was great that ...* (name of IT PD staff member deleted) *could come and show me what I needed to know. I couldn't fit in a general seminar.'*

> *'One-on-one means you can jump straight to what you need to know...'*

Small Group IT PD consultations

It is interesting, but not surprising, to note that almost all small groups of staff that requested PD on a particular area were working together on technology-based projects. Considerably fewer staff chose this style of PD compared to group workshops or one-to-one consultations. Perhaps the difficulty of coordinating with another staff member to find a suitable time was only overcome when there was a very strong need, such as working together on an IT-based project. Those staff members that requested small group IT PD found it very useful and relevant to their needs.

> *'I have found actually working on a project extremely helpful as I can apply it directly to my needs and ask for help as I need it'*

> *'The best way to learn is through engagement with real problems/needs relevant to the user. As such one to one and small group learning is best.'*

Technology Mentors

A pilot technology mentor scheme involved nine staff members ('mentees') who were paired with Education students as their technology mentor. A match between the staff member's IT needs and the IT skills of the students was made and it was ensured that the Education student (mentor) was not enrolled in a subject taught by that staff member. The staff-student pair set a schedule to meet approximately ten times during second semester. There was mixed success with this scheme. One staff member in particular was very pleased with the scheme.

> *'I am delighted with the scheme - in fact I have developed an academic conference paper on it.'*

For other staff the scheme was less successful, with one staff member withdrawing due to limited time to meet with her technology mentor, and others expressing dissatisfaction with some aspects of the scheme, including the matching of their skills levels with those of the mentors and timing difficulties. It is felt that if we were to continue a technology mentor scheme, then the mentors would need a greater amount of training in how to be an effective mentor and greater effort be put into matching staff and IT mentors.

Hidden Costs of PD

When considering models of IT PD, as for all expenditure, the balance of cost to effectiveness of each must be taken into consideration. When looking at the IT PD models offered, at first glance the large group IT PD workshops appear to be the most cost effective, as many staff can learn about the material in a single session. The one-to-one IT PD may appear to be perhaps 15 times more expensive, as the IT PD Coordinator is working with a single person at any time rather than with a group of 15. This is not really the case, as when a Faculty organizes a group IT PD workshop it is paying the salary not only of the IT PD Coordinator, but also the salaries of all participants of the workshop. This substantially changes the calculations of costs and benefits, and it is not unlikely that the IT PD Coordinator will be the lowest paid person attending a workshop! When costing PD within a faculty, the real costs of all participants of the PD should take into account, not just the cost of the presenter or room hire. It is likely to be considerably more cost effective for the IT PD Coordinator to spend half an hour in a customized IT PD consultation with a professor, than that professor to attend a two hour workshop where her specific needs may or may not be met.

However, I still believe that large group (15 people) IT PD workshops have many benefits — many staff can be introduced to the basics of an application or a style of teaching in a single session and useful discussions and collaborations may ensue. However, group IT PD workshops need to be supported with follow up individual or small group customized IT PD consultations that allow staff to further develop skills in those specific areas that they have a need or interest in developing. We found that making an opportunity for individual IT PD consultations when installing software onto staff machines following an IT PD workshop was extremely useful. Staff were pleased to be having the software installed (as they had requested it following the workshop) and were receptive to learning about it and to developing further skills in using it for their specific needs.

Conclusions

During 2000 much effort and resources were placed in developing and extending the IT skills of the staff of the Faculty of Education and from survey responses and from anecdotal comments the IT PD opportunities offered were appreciated by staff of the Faculty. With ever-increasing pressures on staff to publish more, dropping staff-student ratios, and pressures to use IT as a routine part of teaching, it is increasingly difficult for many staff to find the time to attend group IT PD workshops. Staff, and in particular senior staff, are more likely to seek help in developing their IT skills if the PD comes to them, at a time that suits, on a specific topic of need, rather than having to fit a workshop into a busy schedule. This 'Just in Time' model of IT PD is not as expensive as it may first appear when the costs of attendees, as well as that of the workshop leader, are taken into consideration.

After trialling a range of IT PD models in the Faculty of Education during 2000, we will continue in 2001 to support the position of IT PD Coordinator who will be responsible for organizing IT PD workshops for staff and for one-to-one and small group IT PD consultations, as these two models appear to be the most successful

for developing IT skills of staff in the Faculty. In addition to continuing these programs, in 2001 particular efforts will be placed in providing more IT PD for general (mainly administrative) staff of the Faculty and for ensuring the department that was underrepresented in 2000 is targeted for IT PD during 2001. These goals will be achieved by organising IT PD workshops of specific interest to administrative staff (who are then likely to request one-to-one consultations) and by organising workshops within the physical space of the underrepresented department and, where possible, in times that have already been allocated by the department as department seminar timeslots. This, too, is likely to generate requests for further one-to-one consultations. It must be noted that important factors in the success of the IT PD program were the strong interpersonal and technical skills of the IT PD Coordinator. That this person has skills that support staff in their learning about IT and encourages and develops confidence in using unfamiliar tools is critical to the success of such a program. Our faculty was fortunate to appoint such a person to this role and the increased confidence of staff in using advanced aspects of IT is evident. Many comments on the survey mentioned by name the IT PD Coordinator and specifically referred to his approachability, skills, and availability. It is interesting to note that the person in this role was not trained in IT as a discipline, but rather has a very strong knowledge of a wide range of software applications and how they can be used to support learning, was keen to learn new applications, and, most importantly, had a wonderful manner that made staff feel that they could achieve whatever they wanted to. This aspect of developing the confidence, as well as the competence, in using IT is an important, and sometimes overlooked, aspect of IT PD.

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Supporting the Professional Development of Preservice and Inservice Instructors: Aspects Toward a Nurturing, Creative Learning Environment

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Abstract: Professional development opportunities must offer a learning environment that creates a nurturing, creative, successful atmosphere for the learners. Instructional design models, learning styles and technology implementation strategies impact this supportive environment.

Introduction

The careful development of a learning environment is imperative towards the success of all learners within a classroom of eager, and perhaps not-so-eager, learners. This is obvious to all professionals within the realm of instruction. However, the thought and care that is focused upon developing a nurturing, creative learning environment for PreK-12 learners may not always be taken with preservice and inservice teacher educators; after all, many professional educators remain so focused upon the PreK-12 learners that we "miss the forest for the trees", so to speak. Preservice and inservice teacher educators also desire and deserve a supportive, nurturing, creative learning environment within the professional development opportunities.

Professional development opportunities that focus upon instructional uses of technology are examples of environments in which a nurturing, supportive atmosphere will aid the preservice and inservice teacher educators in developing a level of comfort with technology and, slowly, move towards the appropriate and successful integration of technology within their classroom. Numerous aspects lead towards a supportive, nurturing atmosphere in which the creativity and love of learning will present itself; but what specific aspects will aid the professional development opportunities when working with technology? Technology-phobic preservice and inservice teacher educators abound within the education profession but, with appropriate care and guidance, the technology-phobic can become the technology-savvy, learner-centered facilitator in the classroom.

Creating a Supportive, Nurturing and Creative Learning Environment

The fact remains that teachers must attend professional technology development. To embrace technology, teachers must have positive attitudes toward it. It is imperative that instructional technology trainers supply a supportive and nurturing environment. One way to foster a supportive environment is to offer multiple-session technology classes. Technology programs in school districts must no longer take the "treat 'em and street 'em" type philosophy where teachers are required to attend one-day workshops. The danger of one-day workshops is the tendency for educators to not use the newly learned technology. In a survey dispensed to an elementary school in the Houston metropolitan area, 89% of the teachers surveyed admitted that they did not use the technology after taking the one-day technology workshop. The same survey also illustrated 75% of those teachers appeared dissatisfied or somewhat dissatisfied with the technology professional development training that they had received. Ehley (1992) found that teachers require multi-session workshops in order to feel successful with the computer. One-day technology workshops have a tendency to leave teachers feeling isolated and frustrated. By breaking up the technology training into three to six learnable sessions, teachers appear less anxious about the computer and can concentrate on the material. In addition, multiple training sessions let teachers learn smaller chunks of material at a time for faster acquisition of the skill.

Another positive component of multiple training sessions is the fostering of relationships between fellow teachers. This bond can reduce feelings of anxiety and frustration and help create a supportive environment for all technology users. The bond can even continue to blossom after the training sessions have ended. The Intel Corporation has just unleashed a successful teaching technology program called, "Teach to the Future" in which an underlying belief that support for teachers does not end after finishing the 40-hour training modules is apparent. Further, Intel has created a lesson plan bank and listserv for all Intel participants to study and use. Through the implementation of supportive, nurturing, creative learning enviornments and longitudinal time elements that enhance the learner's acquisition of relevant knowledge and implementation skills, the success of the learning environment can be significantly heightened.

Instructional Uses of Technology

Teachers' attitudes toward technology and computers vary widely in any give school. If teachers see the introduction of computers into their subject as bringing curriculum change with it, they may react in different ways. While some may adopt a resistant attitude to this change, others may see the change as a cure for boredom and see themselves as innovators (Bennet 1980). In addition, attitudes not only affect choices but also can be unconsciously transferred to students through modeling (Martin 1986). Proving teachers with quality instructional uses of technology is an important step in giving teachers sufficient opportunities to acquire and learn technology for the classroom.

One way to show teachers how to use technology is give them authentic learning situations in their training. For example, one technology specialist sits down with a school group, team, or individual and identifies a teacher's technology needs. After the initial meeting, the specialist then proceeds to build a CTP or a Classroom Technology Plan for the teacher. In the CTP a list of technology goals are listed along with the real authentic products that will be produced. Real and authentic learning activities are crucial in developing a successful learning environment. Knowles (1984) was one of the first researchers to identify the importance of real and authentic learning situations in adult learning. Knowles felt that adults are motivated to learn after they experience a need in their real-life situation, because adults do not learn for the sake of learning they learn in order to be able to perform a task or solve a problem. To apply Knowles' theory in education, instead of showing teachers how to use spreadsheets by opening up a program and exploring the interface, a better instructional use would be to create a teacher gradebook. Creating a teacher gradebook is a real and authentic product that the teacher can take back into the classroom and use. The instructional uses of technology are ever expanding; however, the appropriate and successful integration of technology into the learning environment is imperative.

Conclusions

A technological revolution is under way that involves teachers. In considering the role of technology in learning, educators are faced with a number of challenges, including how to respond to technology and how to utilize it without diminishing the learning experiences (Field, 1997). The time has come to prepare our nation's educators with quality, supportive, and nurturing learning environments to learn the technology skills they so desperately need.

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The JASON Academy: Explorations in Online Science for Middle Level Teachers

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Abstract: The JASON Academy for Science Teaching and Learning is a new initiative of the JASON Foundation for Education. Beginning in September 2001, the Academy will offer online professional development courses for graduate credit and CEUs to middle level (grades 4-9) teachers of science. Twelve science content courses will include modules focusing on energy, marine science, Earth Systems, and pedagogy. The goal of the Academy is to enhance the science content background of teachers and provide them with the tools to help students learn more effectively.

Beginning in September 2001, the JASON Academy for Science Teaching and Learning will provide online science courses for middle level teachers (grades 4-9), supplemented by "Lab Pack" materials for hands-on science activities with students. The goal of the Academy is to improve the science content background of teachers of science to help them become more effective teachers. Taking advantage of multiple delivery systems offered by advanced systems architecture, the online courses will be tailored to meet individual teacher's learning and teaching styles. Courses will be integrated and thematic in design, but each will emphasize physical science—an area in which both teachers and students need more concept understanding and practice. The Academy's initial course offerings will include the following.

- A required introductory course, *Introduction to Online Middle School Science* (five weeks long and one credit unit) which will provide an orientation to navigating online science and using the Lab Pack materials in investigations with students.
- Eleven content courses, offered concurrently, each 5 weeks long and one credit unit.
  - *Light and Heat*
  - *Electricity and Magnetism*
  - *Forces and Motion*
  - *Water Quality*
  - *Ocean Science*
  - *Aquatic Ecosystems*
  - *Structure of the Earth*
  - *Earth's History*
  - *Earth in the Solar System*
  - *Teaching Project-Based Science*
  - *Assessing Student Learning and Work*
- Lab Packs containing light, temperature, and voltage probeware, software, and student activities will serve as the Academy "textbook." Teachers will use them with their students to reinforce the science concepts they have learned on-line. The kits will insure that teachers and students have experience collecting and analyzing data using hand-held devices and probeware.
- Pedagogy embedded throughout the courses with inquiry being the overarching mode of instruction and learning. Course modules will be tied both to the National Science Education Standards as well as to state science standards.
- Pre- and Post-Assessments and weekly quizzes and surveys to provide continuous feedback on teacher progress and course effectiveness.

The JASON Academy is forming partnerships with crediting institutions and credentialing agencies in several states to provide teachers with options for graduate credit as part of an advanced degree program and continuing education units to be used for certification and recertification requirements. Responses to a survey of state science supervisors provided valuable contact information for state university crediting and state certification requirements.

In November 2000, the JASON Academy conducted a field test of a two-week prototype of a JASON Academy course on Electricity and Magnetism. Findings included the following:

- Based on experience with the JASON prototype, 100% of the field testers would take another online JASON Academy course
- Overall rating of the course on a 5-point scale: 4.6
- Top reason to sing up for an online course: Expand science knowledge, followed by graduate credit and CEUs toward certification.

Field testing teachers appreciated the flexibility of online learning as well as the colleague interaction and ease informal presentation format.

The Challenge of Developing College Wide Technology Standards

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Abstract: The technology requirements prescribed by NCATE for teacher education programs pose unique challenges when *all* programs within a college of education and human development enter the self-examination process together. This research study examines the growing pains of one university's college of education in designing and implementing technology standards.

Purpose

The technology requirements prescribed by NCATE for teacher education programs pose unique challenges when *all* programs within a college of education and human development enter the self-examination process together. As technology competencies become integrated within the curriculum, faculty and student proficiency becomes an immediate rather than long-term necessity. Moreover, professors of education must model the use of technology throughout the curriculum. At the University of Southern Maine, the College of Education and Human Development enrollment shows that 80% of the students are in graduate programs and 25% are in non-teacher education programs including school counseling, clinical counseling, school psychologist, school administration, and adult education. Many graduate students do not have a technology rich background and, as commuting students, have little opportunity to use the university resources. Both students and faculty struggle with the technological changes in curriculum and instruction. This case study examines the growing pains of one university/ college of education in designing and implementing technology standards.

Perspectives on Technology in Higher Education

In the 1980s computer literacy emphasized programming skills, computer science theory, hardware platforms, and software applications (Friedstein, 1986, and Ayersman, 1996). Computer literacy was a rather esoteric arena; certainly not for everyone. By the 1990s, computer literacy became inexorably connected to functional literacy with employers expecting college graduates to be computer proficient. A few colleges and universities at the undergraduate level began to set fairly basic expectations for all students, advertised on the school website and in paper publications. Georgetown College and Mary Washington College are undergraduate institutions that have led the way in advising students to meet their technology expectations in advance of enrollment. At the University of Nebraska, the college of education asked all teacher education candidates to be computer competent before entering the teacher education program and the preservice teaching experience. Guidelines for entry-level computer competency skills were written and approved by the faculty in 1991.

However, many graduate students arrive with high levels of anxiety about technology that may affect their academic performance and personal self-esteem. Hudiburg and Necessary (1996) found that computer-anxious

college students often used emotionally-focused coping strategies such as distancing, seeking social support, and escape avoidance. Low computer-anxious students use problem-solving strategies and were more likely to accept responsibility. Attitudinal issues are especially important to the non-traditional students' successful return to college. When they do learn to use computers, they experience greater increases in self-esteem than traditional students (Mruk, 1987).

Faculty, too, have differing attitudes towards the technology revolution. Kasworm (1997) advises college leadership to develop profiles of different faculty as learners with descriptions of how they approach or resist technology. Then a variety of paths for learning can be made available, from workshops to mentoring. Additional studies find that technology can increase and strengthen the ways faculty engage students both in and out of the classroom (Gillette, 1996). Faculty report that the increased time that is required to answer electronic messages is balanced by the flexibility of email over connecting by phone or making office appointments. Electronic conferencing seems to be a double-edged sword. Some students who are quiet in class increase their participation using email and electronic conferencing, needing the additional time and reflection to post either their observations or questions. In order to get increased use, key factors must be present: clear advantages for use, opportunity to overcome computer phobia, excellent support during learning, unique fit with lifestyle, and something to share (Wilson, 1996). One might extend the belief that these factors predict success for faculty as well.

The Process of Developing Technology Standards

A subcommittee of the College of Education and Human Development (CEHD) Technology and Media Committee was charged with the task of developing recommended technology entrance and exit standards for all programs to integrate within the college. In considering how to proceed NCATE technology standards, ISTE standards, and a variety of other universities' technology standards were consulted. It was agreed that the recommended entry standards would represent the technology skills that are necessary for students in any CEHD program to have in order to successfully engage in program/department communication and course learning activities. The recommended program technology outcomes would represent the goals or final outcomes that each graduate will have met upon completion of any CEHD program. And, the standards needed to be stated in such a way that all programs within the college would be able to apply them.

A draft document was presented to the CEHD Technology and Media Committee for feedback. Revisions were made based on this feedback and a second draft was given to the chair of the Faculty Development Subcommittee (FDC) (see Figure 1).

Recommended Minimal Entry Skills

- Demonstrate skills using e-mail communication tools
  Attachments Nicknames Cut & paste from document
  Utilizing a listserv Signature Organizing messages
  Sending Netiquette Replying
  Forwarding messages

- Demonstrate knowledge of and skills in using library databases

- Verify skill in using remote access to university (if applicable)

- Demonstrate skills in using Word Processing productivity tools: cut & paste, spell check, printing, formatting, editing, backing up work

- Operate a computer a system to successfully use software

- Demonstrate an ability to access and use the World Wide Web

Recommended Exit Skills

- Demonstrate an ability to load a new program (cd-rom)

- Using help functions and strategies for troubleshooting

- Having skills across computer platforms and applications
- Demonstrate an ability to use multi-media technology
- Create and use spreadsheet/databases
- Search literature databases
- Use electronic gradebook (if applicable)

Students admitted into programs in CEHD self-select into one of the following orientation sessions that will be held prior to the first semester in the program in order to demonstrate mastery of the entry skills:
Novice orientation & assessment – for those that need assistance in learning and demonstrating competency in the minimal entry skills
Advanced orientation & assessment – for those that need little or no assistance in demonstrating competency in the minimal entry skills
Non-matriculated students will be given this checklist of minimal entry requirements. They will also be required to demonstrate their ability to meet these entry skills.

Figure 1: Draft Entrance and Exit Technology Skills

The CEHD committee decided that an appropriate next course of action would be to document current faculty use of technology to support teaching, to identify faculty needs around technology, and to gather input from faculty regarding the draft entry standards and outcomes for students in as series of luncheons sponsored by the FDC. The goal was to gather rich descriptive data in order to gain an understanding of the faculty's experience and their deeply help convictions about curriculum, pedagogy and student needs in such a way as to contribute to the design and implementation of technology standards in higher education.

The following questions represent the major concerns of the faculty in regards to adopting technology standards:

- How should we handle non-matriculated students and these standards?
- Where will the resources come from to support faculty to learn to incorporate technology into their coursework and get the appropriate hardware/software?
- Aren't technology skills moving targets, having a fast rate of change?
- Will these standards deny people access to CEHD courses if they can't meet entrance standards?
- Should faculty integrate the teaching of these skills into their class sessions, or should students complete university workshops outside of class time?
- How can these standards apply to all CEHD programs?

With these concerns in mind, a second draft of the "entry standards" were presented to the CEHD faculty at a fall meeting attended by full-time faculty as representative samples of each of three departments: Professional Education, Teacher Education, and Human Resource Development. In the discussion, many of the concerns related to the language used in the document or the method by which students would be evaluated in relation to these technology standards. While the original intention of the standards subcommittee was to have a process by which students would demonstrate proficiency in the entry standards, faculty expressed concern about managing this assessment. Faculty felt strongly that "technology skills" should be changed to "technology standards" to reflect our intent. There was concern about the notion of technology "entrance requirements" to CEHD programs. How could students demonstrate mastery of the entrance standards prior to starting a program? Would non-matriculated students be required to meet these standards as well? Would non-traditional students be "shut out" of courses due to lack of technological proficiency? But, at the same time, how could programs systematically incorporate technology into courses if some students would have met the entry standards and others would not? These issues needed to be resolved before the entire faculty felt comfortable adopting the proposed entry standards.

At a subsequent meeting, the following recommended entry standards were adopted by the CEHD faculty – with the understanding that these were recommended and not required and that they would be included in the CEHD catalog

so students would be made aware of their existence. But, in the discussion, it was apparent that faculty needed a common set of technology skills that all students could perform in order to systematically move them towards the technology outcomes (See Figure 2).

- Demonstrate skills using e-mail communication tools

Attachments	Cut & paste from document	Nicknames
Utilizing a listserv	Signature	Organizing messages
Sending	Netiquette	Replying
Forwarding messages		

- Demonstrate knowledge of and skills in using library databases
- Verify skill in using remote access to university (if applicable)
- Demonstrate skills in using word processing productivity tools: cut & paste, spell check, printing, formatting, editing, backing up work
- Operate a computer a system to successfully use software
- Demonstrate an ability to access and use the World Wide Web

Figure 2: Adopted Entry Technology Standards

Once the entry standards were adopted by the CEHD faculty, a second draft of the recommended technology <u>outcomes</u> were presented at each department meeting for feedback. The feedback was used to modify the outcomes for vote by the CEHD faculty. The focus of this discussion centered around using appropriate language in the document that would reflect general outcomes that all programs could apply. In addition, a general agreement was made that program faculty could determine how these outcomes were systematically incorporated into the coursework. At a spring CEHD faculty meeting, the CEHD Program Technology Outcomes officially adopted (see Figure 3).

As a result of an educational program in the College of Education and Human Development, students should be able to:

- Demonstrate an ability to load a new program
- Demonstrate an ability to use help functions and strategies for troubleshooting
- Demonstrate skills across computer platforms and applications
- Demonstrate an ability to use multi-media technology
- Demonstrate an ability to create and use spreadsheet/databases
- Search and evaluate electronic databases and World Wide Web sites
- Use electronic gradebook, budget software, financial software where applicable
- Demonstrate knowledge of equity, ethics, legal, and human issues concerning the use of computers and technology
- Integrate technology into professional work (e.g. internships, field work, etc.)

Figure 3: Adopted Program Technology Outcomes

In addition, a follow up motion was voted on and approved that required the CEHD Executive Council (Deans, department chairs, program directors, etc.) to review the standards and oversee the development of consistent evaluation of these outcomes across CEHD programs. This allows program faculty to determine the ways in which technology standards will be integrated into courses. In conjunction with adoption of these standards, a series of "Technology Day" workshops are being offered each semester to move faculty an d staff forward in their own technology skill development as well as their pedagogical awareness of ways to integrate technology in their teaching.

While it may appear that the process of developing integrated technology standards is complete, the technology subcommittee is now working to align the newly adopted ISTE standards (ISTE, 2000) with our already approved standards. In our upcoming 2002 NCATE review our college will be required to demonstrate the integration of the newly adopted ISTE standards into our programs.

Some Reflections Based on our Work

Based on college-wide conversations during the development of technology standards a number of recurring observations become apparent. First, faculty are beginning to use a variety of technology in their professional lives and in the classroom, however, without specific direction. Use is primarily centered around improved organization and student interest. Faculty are not using technology to promote higher level thinking and do not see themselves as pedagogical models related to technology. Second, faculty are most intrigued by the use of electronic communication systems to ease communication particularly with graduate students and in distance learning contexts. In addition, faculty use electronic communication to build relationships that extend beyond the original course. As Gillette (1996) pointed out, ease of communication encourages students to ask more questions and clarify tasks, resulting in an improvement of the ways students are engaged in their learning. In this way, technology can enhance the teaching-learning environment. Finally, the initiation of general technology entry standards and programmatic outcomes has raised specific concerns across programs which includes issues such as: assessing and monitoring technology competencies; computer access by commuting and/or distance learning students; standards as moving targets due to technology innovations; untrained faculty; lack of technical support personnel who have pedagogical understanding. These issues are still at the crux of our struggle in actually engaging faculty in systematically incorporating technology in their teaching and expecting students to produce technology-enriched products.

Recommendations to others considering our work

There are certainly a number of lessons that other colleges can take from our experience in working towards technology standards. First, create a technology plan with standards/outcomes at the core. Once a college is clear about the expectations, appropriate decisions can be made regarding faculty load, budgets, faculty/staff development, needed equipment and support, etc. Second, create technology entry standards that faculty can count on and use in curriculum planning and technology integration. It is important when making a programmatic attempt to integrate technology, that basic prior knowledge can be assumed so that course time does not have to be spent in teaching technology skills. Third, create technology outcomes that allow for program autonomy for course integration and assessment. It was a critical element in our work to make sure that all voices were heard across disciplines in the development of the standards. In addition, it has been essential that the adopted standards fit all the disciplines within the college so that individual programs can take the standards and integrate them appropriately. Fourth, entice faculty support through a better understanding of the pedagogical opportunities of technology as well as training them in specific hardware and software skills. Learning the technology skills is crucial, but developing a better pedagogical understanding of how to incorporate that technology to promote higher level thinking is just as important. Finally, include questions related to technology standards within the college-level curriculum review process. One way to ensure the appropriate integration of technology standards into program curriculum, is to require its inclusion in course syllabi.

Significance

Most colleges and universities do not assess computer literacy as part of the admission process and often do not define computer proficiency for their graduates. This unwritten policy of "don't ask; don't tell" has not served either students or faculty well. Rather than serving as barriers, clearly defined expectations can help students prepare for coming into higher education, use technology as a tool for learning throughout their program, and understand the expected technological outcomes of their education. More importantly, as we raise the bar in terms of technology skills within courses, colleges and universities can then focus their technology mission on educating for the critical use of technology.

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Problem-Based Learning Resources for College/University Professors

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Abstract: The authors define problem-based learning (PBL), an instructional method used by teachers and professors to teach problem solving and to replace rote memorization and passive learning. PBL's process is explained. The historic association with John Dewey's progressive movement and constructivism are also included. Questions are answered that deal with the changes from a traditional classroom to problem-based learning. Academic achievement, the roles of teacher and student, generating problems and assessment tools are covered. Examples are given for further study.

What is PBL?

Problem-based learning (PBL), a teaching technique or instructional method that was introduced in the mid-60's by Physician and Medical School Professor Dr. Howard Barrows at McMaster University in Ontario, Canada has now been used widely in medical schools, schools of nursing, pharmacy, dentistry and optometry, as well as in some undergraduate and graduate programs of other disciplines in colleges and universities in the U.S. and Canada. Many middle and high schools have also adopted the PBL method to raise student achievement and contribute to school improvement programs (Delisle, 1997).

Dewey and Constructivism

Problem-based learning has its roots in John Dewey's progressive movement. Dewey believed that teachers should teach by appealing to student's natural instincts to investigate and create. Problem-based learning is also considered as one of the best exemplars of a constructivist learning environment. Constructivism is a teaching/learning model that holds the notion that learners should generate their own knowledge through experience-based activities rather than being taught it by teachers(Roblyer, 2000).

The PBL Process

The PBL process is broken down into the following structured steps.

1. The teacher presents a problem.
2. The class is divided into groups.
3. The groups generate ideas/hypotheses.
4. The group members determine what they know about the problem.
5. The students determine what they need to know.
6. The students develop a plan to acquire the information needed from reliable sources.
7. The students use the new information to re-evaluate the problem.
8. The students generate a product such as a written paper, class presentation, or web page.

Some Frequently Asked Questions About Problem-Based Learning

Academic Achievement

Faculty question if content will be learned when using PBL. Palmer (1998) in *The Courage to Teach* shares about a medical school that instituted problem-based learning and found that content scores increased. Palmer thinks it is because the brain works best with information presented in patterns of connection—looking at the patient as a whole and the shared learning—the group is smarter than the individual alone.

Generating Problems

PBL is changing the way that teachers traditionally teach. So more preparation must go into getting ready for class. Creating problems seems to be the biggest challenge for teachers changing to problem-based learning. However, once teachers take the plunge, they find that the challenge makes them feel revitalized. The activity is intellectually stimulating (White,1995).

Role of the Student

This type of learning puts more pressure on the student. Because there is not one right answer, the students must look at different angles of the problem and come up with the best answer based on the situation. For students who are used to memorizing the teacher's notes, this causes anxiety. For bored students the challenge is welcome.

Role of the Teacher

The teacher goes from being a lecturer to being a coach (Lynrock, 1999). This is a change for the teacher in that new behavior skills are required. Instead of lecturing to a group of students, the classroom becomes much like a newsroom. Students are involved in different aspects of problem-based learning—researching information online, calling an expert, collaborating in a small group to agree on the final answer. It makes for a messy classroom which is sometimes hard for teachers to accept.

Assessment Tools

Because problem-based learning is different from traditional learning, different assessment tools are needed. Students work in groups, and peer assessment can help determine the contribution of different members to the group project. Oral and written reports of the solution can be used to assess what was learned. Traditional exams can also be used. Since each student will learn different things because of the activities involved, some form of self-assessment will help determine the new skills the student has acquired (Jones, 2000).

PBL Examples

One example of PBL is a webquest (Summerville, 2000). The teacher finds the information on the web and has the students interact with the data to do some kind of project. Many teachers are doing this and examples are on the web (http://edweb.sdsu.edu/webquest/webquest.html) Problem-based learning has been used successfully in graduate, undergraduate, and K-12 schools. It has also been used in various disciplines in arts and sciences such as criminal justice, political science, public administration, physics, biology, chemistry, and art as well as education and business (http://www.udel.edu/pbl).

Reiman (1998) in *Thinking for a Living* talks about the skills needed in the future. Problem-based learning helps prepare students for the jobs in their future.

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Together and Alone: The Instructional, Technical, and Psychological Outcomes of Faculty Building Online Courses

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Abstract: This paper seeks to report the findings of a study concerning online course development at a midwestern university. The study examined the use of a cohort model for online course development and the typical individual online course development to support the instructional, technical and psychological aspects of online course development by faculty in higher education. The study sought to answer the question: Can a cohort model provide the technological, instructional, and psychological support needed in the development of online courses in ways different from a faculty member working alone in the development of an online course?

Introduction

The migration of a traditional course to a web-based environment requires a rethinking of the instructional design, grading methods, group-work designs, technology skill level, and the community building that often occurs in a traditional classroom. Faculty members often lack the technical skills necessary to redesign the course materials for the web environment to meet the high standards they desire. This leads to frustration with online delivery and a negative feeling that the course will never "work as it did in the traditional classroom". In reality, this attitude is fact—the course will never work as it did in the traditional classroom—and must be changed to achieve the desired outcomes in this new visually based web environment. However, since course development for higher education faculty typically occurs in isolation, faculty can become frustrated with the development of new materials for the web, especially when they lack an understanding of how to work in this online medium.

The College of Education and College of Music has developed a group of online courses in support of their mission to provide ongoing opportunities to graduate students with a desire to obtain certification or renewed certification for teaching and administration as well as undergraduates often closed out of "high demand" courses. In an effort to meet a rising demand by undergraduates, area teachers, graduate students, superintendents, and international students for more flexible educational services, these colleges have developed online courses for the following students:

1. Graduate students in Computer Education and Technology who must obtain certification to become K-12 Technology Coordinators,
2. Graduate students in Music Education who must obtain certification to become K-12 Music Teachers,
3. K-12 teachers who now must obtain a masters degree in their field to maintain Ohio certification,
4. Superintendents in rural communities who must now be certified by the state of Ohio to hold a superintendent position,
5. Undergraduate students who need required courses for student teaching that are typically in "high demand" each quarter, and
6. Graduate students in African Studies and Instructional Technology as part of the College of Education linkages to the University of Western Cape in South Africa.

In discussions with the Center for Innovation in Technology for Learning (CITL), as the courses were being developed, faculty were concerned with developing the courses to meet the same standards as experienced in the traditional classroom. Often asked was the question, how could technical problems be addressed especially for the "novice technology user " by the faculty and the online student? Another major concern was how the lack of face-to-face contact with students would impact the faculty member as an instructor and on teaching evaluations. Questions were raised about the possibility of working with a team of faculty during the development of individual online courses. These questions lead to the development of a cohort of faculty who worked together to develop their individual online courses.

The Study

The members of the cohort group were College of Music and College of Education faculty presently developing online instruction using *Blackboard CourseInfo 3.11.* Personal interviews with faculty and a descriptive approach in which written information was used to substantiate the question to be answered was used during data collection. Attention was given to the details of the online course development process and changes as the faculty designed their courses.

The cohort met to establish the group, to identify technological needs and to discuss planned instructional methods for their courses. The cohort had opportunities to view other online courses in which *Blackboard CourseInfo* had been used and how the various materials were presented. Often the development of online course materials takes a different form than originally planned when faculty see various methods of presenting an idea. Cohort members discussed how small groups and discussion would occur within their course structures. The College of Music faculty had very different instructional problems than the College of Education in that the College of Music needed to be able to place sound files within the *Blackboard CourseInfo* for their students to evaluate. This posed a unique problem to the music faculty because most were novice users of this application of the technology. Help from the faculty in the College of Communications and WOUB Public Television was enlisted to help the faculty envision the possibilities of presenting the music scores online and to help develop the technical skills needed to accomplish the task. Most of the discussion by the cohort focused on course development, problem solving, technical problems, technological skills and course changes to be made as the course progresses. Discussion by the members of the cohort was recorded. An instructional technology graduate student and the researcher provided technical support to the members of the cohort. Members were asked to reflect upon the process of developing the course and the instructional and psychological hurdles that were encountered in the process. The graduate student and the researcher also maintained a journal of discussion with members, the meetings, and their reflections of the process as an observer.

A group of faculty who have worked alone in the development of their online courses was randomly selected from a list provided to the researcher from the CITL. The faculty were from colleges across the university. Selected faculty were interviewed using the same interview questions as the cohort group but with an emphasis on the individual course development process. Discussion and answers concerning the interview questions were recorded for examination.

All journals, self-assessments, meeting notes, and recordings from the cohort as well as discussions and comments from non-cohort faculty were examined to determine common themes and differences between the two groups in their instructional, technological, and psychological approaches to the development of online courses (Bogdan, R. & Biklen, S., 1998).

Findings

Multimedia and telecommunications technologies continue to evolve and advance with the promises of offering the learner with a richer and more meaningful education relevant for the future workplace and learning. The incredible growth had created challenges for educator to expand educational opportunities beyond University campuses to provide on-demand, anytime, anywhere instruction. However, faculty members often lack the skills necessary to create online courses because technology use was not part of their pre-service education (Cyrs, T. 1997). This study compared the use of a cohort model and the typical individual online course development by faculty with reference to technology, instructional and psychological support.

Solving Technical Problems

Technological problems comprised concerns related to the hardware and software used in online learning environments. These include problems related to bandwidth, speed of communication lines, software applications, and cost. The most prominent technological challenge identified by the study was the frustration associated with lack of knowledge in using the software (*Blackboard CourseInfo 3.11*) by individual faculty working alone. Individual faculty members working alone on course development adopted different approaches to developing their online courses:

Locate an Expert. The individual faculty members with limited skills and knowledge of developing online course used a paid expert in course development. The expert was typically a former student of the program who was very familiar with the course content. Typically they had no face-to-face interaction and all discussions were conducted via e-mail and the telephone. Using such an approach helped the faculty member to avoid having to be confronted with technology issues associated with the use of the software. The faculty member used the expert as a sounding board for technical problems.

Locate a Helper. Friends with technical knowledge were also identified as sources of help to some individual faculty members building online courses. One faculty member working alone stated, "I posted all the contents and inserted the images and then I gave it to my friend. He kind of made it look nicer by using *Photoshop* and inserted some graphics". The faculty member spent some time with the helper, three to four hours, to learn how to use the *Blackboard CourseInfo* software. The rest was e-mail back and forth, and it was effective. Several faculty stated, "Having a helper gave me the encouragement I needed to do more".

Locate a Mentor. Some faculty members identified mentoring as being an effective and efficient approach to online course development. Comments often included statements as; "it is faster if someone helped you than trying to figure it out yourself". The drawback to this approach was the limited number of meetings schedule to work together. Often the mentor and faculty member did not feel obligated to meet due to the independent nature of the course development.

Build a Team with Skills. In another approach a team of faculty members with expertise in different subject areas agreed to develop an online course together. Each member of the team was identified as having specific skills to give to the course. The member with skills and knowledge in technology applications was responsible for any technical setbacks that they encountered in the course development. This approach to "figuring things out" depended on one individual. The longer it took to figure it out, the longer the team had to wait.

Locate Support. Individual faculty members also identified several sources of support, one being the online manual for *Blackboard.* When confronted with a technical problem the faculty member referred to the online manual or used the "Help" menu. "I would go to the manual to try and figure it out and if I couldn't then I would call the mentor", stated an interviewee. Faculty learned to rely on their own ability to problem solve with the help of manuals. Several indicated they had not used online HELP functions in the past but were experts after developing the online course. The CITL was also named as a source of technical support by individual faculty. Periodically, the center organized workshops for faculty members.

The study indicated that in all the above-mentioned approaches there was also very limited interaction and the main channel of communication was through the e-mail. This left many feeling frustrated with the technical problems and slow rate of online course development. Frustrations were sometime due to messages that were not clear and instructions that are difficult to follow.

According to Forsyth (1990), a group is defined as two or more interdependent individuals who influence each other through social interactions. Communication within the cohort was mostly verbal, at any place and anytime. Individual's technical problems were discussed in offices, hallways, and meetings and at every possible opportunity. Proximity among individuals favored frequent interaction and communication. Individuals' had their offices in the same building and often next to each other. There were frequent face-to-face interactions that promoted positive interdependence.

Individuals felt supported technically and inspired to develop their online courses. One cohort member admitted his lack of desire to use the technology was altered when he began working with the cohort. He stated, "First it [cohort] has exposed me to the reality of using technology which I have been shying away from. Because I don't understand the language. But this challenge is helping me to face reality and I like that. I am excited working with a cohort". Several faculty in the cohort echoed the statement of this cohort member, "I saw how excited she [a cohort faculty member] was about the online course development and how well her course was going and I thought, I want to do this too. And I can with her help!"

Cohort members found that each had technical strengths that they could call upon when the technological tasks seemed overwhelming.

Battling with Instructional design

The impact of online learning on the learner was of major concern to all faculty members. Both the individual faculty members working alone on their online course development and the cohort faculty members voiced concerns about developing strategies that would empower the learner, encourage cooperative and independent learning as well as active learning in the online environment. A complaint often voiced by learners in the online learning environment is that they feel isolated and unconnected to other members in the class or to coursework.

How to design online instruction to meet the standards, how to stimulate critical thinking, questioning, and discussions, how to ensure effective group work, case study development, inquiry projects, and lectures were the same concerns voiced for the online instructional design as with the traditional instructional design. One individual faculty stated, "All of these things added together make an interesting course and only some of those things are available to you on the online format." In questioning the individual faculty, the medium seemed to drive the methodology thus challenging individual faculty member's ability to create online courses with desired instructional goals. In certain disciplines e.g. educational administration, faculty members were confronted with the problem of how to vary the instructional format. "The design was a real challenge and having to re-think teaching strategy was a real challenge". The designing of the online courses seemed most difficult to the novice faculty member and the amount of time spent in the design and redesign was often at the expense of other duties.

Deciding on the content, materials to include, how much information to provide was a constant question in the instructional design process. An individual faculty member stated, "Working in an environment that is filled with multiple media can lead to feeling of being overwhelmed. In developing the course, it was hard to figure out how much information I needed to put in the course. It took a lot of time and effort, many months of work." Many indicated that the course must be complete when implemented or the results can be disastrous. Faculty indicated that the changes made after the course is implemented take enough time without working on building the course as you teach.

The study also indicated that some individual faculty members were concerned with students' reaction to the information provided and choices for students. Several suggested, "There were hundred and hundreds of links. Information to reinforce content, there were quizzes and group projects." Bringing in a sense of humor and the personality of the instructor online was another concern of all faculty. "In a classroom you can use sense of humor, but in this format, I created some pop-up boxes to bring some other kind of things into the course. It was a little frustrating at times and it took longer hours to get things done".

Members of the cohort group were supportive of each other as a result of interaction and collaboration throughout the development of their online courses. The cohort members indicated that by working together they had an opportunity to become better acquainted with the courses that the other cohort members taught. They were able to better understand the connections between the courses in the curriculum and offer suggestions for connecting the courses through the instructional design process. One cohort member stated, "We saw that the audio/listening pieces could actually be worked on over a spring and summer rather than in just one course. This made the content of both courses richer for the student."

The cohort allowed their creative potentials to be combined for a common purpose. "We had a meeting and we talked about what each other is doing, how it has to be done and how to help each other". "If someone in the cohort was more technologically skilled, that person would help everyone learn how to use the technology and we would in turn help them with developing their content so they were not overwhelmed by doing it all". This allowed individuals to reveal themselves to one another and to receive feedbacks from the group. This process also helped individuals to develop new skills.

Psychological Concerns and Support

The study indicated that individual faculty members were worried about knowledge and skills in using the software (*Blackboard CourseInfo 3.11*). One faculty member said, " The first time I taught online I got 80 emails from the students the first day, which for some reason I hadn't anticipated. I thought, how could I ever do this many emails day to day? When I told a group of my colleagues about all the emails, they said, well you

shouldn't have built the online course. I felt rejected by my peers. Here I wanted to be innovative and teach in a different medium and my colleagues didn't support it. I thought, I will never do this again".

The study also indicated that individual members realized that developing online courses was extremely labor intensive and so having about two people or three on a team, would enable the sharing of work, sharing of ideas and perceptions of what's going on and shape the activities for better learning. One individual faculty member who had found a helper said, "Availability of immediate help/support is essential for individuals working alone, as it releases stress".

Other concerns included how to ensure that the assignments were reasonable and the trouble of having to make this decision alone when there was not a clear understanding of the online environment. One member of the cohort concluded, "Working with a team guarantees moral support and this is too much work for one person to do".

The cohort members had the opportunity to interact and become interdependent emotionally as they worked toward a common success. The cohesiveness within the cohort promoted a sense of trust. Surrounded by a network of support and mutual understanding, members in the cohort had higher self-esteem and experienced lower levels of anxiety. Individuals within the cohort felt free to explore their own potentialities, risk self-revelation and try novice ideas because they felt surrounded by a supportive environment. The cohesive nature of the cohort afforded the opportunity to share thoughts and emotions. Consequently an emotional safety environment was created.

An empirical research on cohorts in university setting conducted by Hill (1992) and Kasten (1992) indicated that students in a cohort reported receiving psychological support from group members, feeling of reduced sense of loneliness, and developing strong affiliations. The study revealed that interaction made them feel connected and not isolated. The also felt emotionally secured. "She was by my side when I am doing all these".

Several cohort members echoed this research sentiment, "I know that they [other cohort members] will be there if I have problems so it makes this easier and I am sure that I will be successful and our program will be successful."

Conclusions

To change the world, faculty need reasons to take risks, to incur resistance, hazard failure, and to grasp the opportunities for action that their vision avails them. It is hoped that this research will provide information concerning the processes occurring when faculty develop online courses with respect to the technical, instructional, and psychological changes associated with online course development. While much research has been conducted concerning the learning that occurs online, the differences and similarities of the learning that occurs, little information is available concerning the changes that faculty undergo as they move from the traditional classroom to the online classroom.

With the use of a cohort formed by faculty, the isolation and frustration often felt in the development of online courses can be lessoned. The faculty members of the cohort group within a college or program typically have similar experiences in classroom instruction and similar interactions with the students that they will teach. The researcher's own experience and antidotes obtained from faculty who have developed their courses without support indicate that the isolation of developing and teaching online can be deterrent to continued online teaching. Also peer pressure by fellow faculty members does not always support the development of online courses, which leads to further isolation. Members of cohorts often remark that the cohort provides them with needed emotional support during periods of stress. The collegiality of the group supports the successes of each person within the cohort and lays a foundation for intellectual stimulation.

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Teachers as Multimedia Authors: A Workshop Developer's Experience

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Abstract: The advent of New Media provides a unique opportunity for teachers to develop their own educational websites. However, learning the necessary techniques and procedures can be difficult. One method for delivery of these skills is to develop a workshop with the objective of learning hypermedia development skills via an integrated project. Using the project as the main teaching tool allows for the learning of the new skills with immediate application to an end product.

Background

Considerable discussion has been made about how best to instruct teachers on designing and developing educational websites. In 1996, a three-hour workshop was given at the Massachusetts Educational Computing Conference on developing such a website. In such a short period of time it is necessary to impart the basic yet important concepts for a successful development process. It was decided to develop the workshop in an integrated lecture / lab format. That is, the participants would be taught a particular concept and then immediately implement it. This gives the participant quick feedback as to their progress in understanding the concepts as well as an appreciation for the practicality of them.

While this format aids the learner, it does create some additional concerns for the instructor / workshop developer. Pedagogically, the workshop was designed and presented in a top-down approach. A top-down approach can be analogized to the construction of a pyramid. The more intricate upper layers are dependent upon the larger, less detailed layers being laid down properly and forming a solid base for construction. The workshop developer must determine what concepts come first and then lay out the remaining sequence of concepts and procedures.

Design and Development

The basic structure of the finished project of the workshop was a main page discussing tornadoes and hurricanes at a high level of detail with links that point to a series of pages that describe each phenomenon in greater detail. Also, an interactive form could be chosen to collect information about the user. A person deciding to follow the tornado path would see text and graphics detailing tornado characteristics as well as a map of a tornado ground track as well as a sound file of an actual tornado. Following the hurricane path will encounter text and graphics describing hurricane behavior and statistics as well as a Quicktime movie of a hurricane from a weather satellite perspective.

The first step was to describe the basic structure of a web page in Hypertext Markup Language (HTML) which was the language used to develop all pages in the site. Drawing on the pyramid analogy, the participants were initially taught the basic structure of an HTML page including how to embed links to point to other pages. They then created the main page with the required text and links to the hurricane and tornado sequence pages. To further complete the skeleton of the site the structure of each of the tornado and hurricane pages were completed.

The hurricane sequence was arbitrarily chosen as the first sequence to be completed. The first page contained links and accompanying text that described Hurricane Luis that hit the Caribbean in 1995, a Quicktime movie of Hurricane Marilyn and text of how hurricanes are formed and categorized. Building upon the basic page structure, participants were instructed in embedding graphic files and then built the Luis page. Next was a

discussion of animation and Quicktime formatted files. The students then added text and a link to the Quicktime file to the Marilyn page. Finally, methods of structuring text lead to an exercise of putting text on the formation / categorization page.

The tornado sequence was then constructed. The main tornado page consisted of a picture of the tornado which struck Wichita, KS in 1991 with some special (blinking) text. Also, a link was provided to view a diagram of the path of the tornado which struck Dimmitt, TX in 1995. Links were also added to point to a page containing a sound file of an actual tornado, a page describing tornado statistics on a state-by-state basis and a page about how to protect oneself in the event of a tornado. As with the hurricane sequence, students were instructed in the required HTML skill and then immediately implemented the necessary procedure(s) to construct the particular page. Along the way, the participants understood how to embed graphics of different types and how each type is appropriate for various instances. They also practiced embedding and understanding sound files, tables and alignment of text portions.

Another important skill that was obtained was the understanding of how all pages in the site can be connected to provide a concise, rich field of knowledge as seen in the figure 1. The dashed lines represent links back to the main pages. The importance of this skill can be seen by the complexity of linkages even in this relatively simple site.

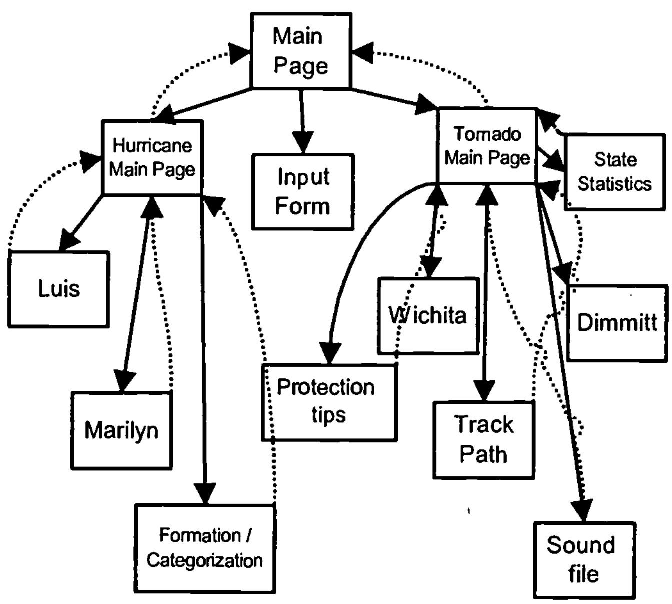

Figure 1: Final Website Configuration

Conclusion / Results

The experience for the instructor and students was a worthwhile one. Students commented on the utility of the skills learned and short time it took to acquire them. They also felt that this "boot camp" approach was an efficient use of their time and many felt a desire to continue learning more and to do some projects of their own. From an instructor's viewpoint, the experience was rewarding and informative. The short course time requires that great care be taken to follow concise but complete instruction immediately with relevant practice and feedback in an efficient manner.

Proactive Faculty Teaching and Learning Initiatives

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Abstract: Faculty do not always get the luxury of time or money to attend professional computer training sessions and read computing trade publications cover to cover. Yet, there is an expectation for continued professional development, often beyond their area of expertise. Academic Computing at the University of South Florida will present the current best practices utilized for faculty training, support and professional development. This presentation will also cover an overview of how Academic Computing integrates into the VITAL consortium and the evolution of faculty computing services. IT support professionals, and faculty will leave this presentation with abundant and diverse ideas to make faculty learning tailored, yet quick and effective.

The computer industry's constant evolution requires full time observation and training to stay abreast. For faculty, the constant pressure of infusing technology into the curriculum and classroom requires deft computing skills and current computing knowledge. Since faculty do not always get the luxury of time or money to attend professional computer training sessions and read computing trade publications cover to cover, there needs to be a treasure chest of efficient and effective computing resources. This expectation for continued professional development can often be met with campus computing resources.

At the University of South Florida several collaborative initiatives are addressing this hot topic. On a broad scale, the VITAL (Virtual Instructional Team for the Advancement of Learning) consortium was established in 1997 to provide a support structure for faculty wanting to integrate technology into their teaching and learning models. VITAL is comprised of seven departments joining forces to utilize differing approaches and services. VITAL units offer faculty assistance and support they need. Through VITAL, faculty members are encouraged to seek individual mentoring and assistance as well as attend workshops designed for small groups. Faculty who want individual assistance with technology issues can call upon a specific VITAL member, or they can reach a "generic" VITAL contact through multiple means. To facilitate access, VITAL has a web site (*http://www.usf.edu/vital*), an email list (*vital@usf.edu*), and a central phone number. Academic Computing participates in this consortium of departments. This paper will focus on the proactive measures Academic Computing takes to provide faculty with computing support and instruction.

Academic Computing supports faculty, students and research while providing a wide variety of technical services. Faculty technical development is also explicitly provided in the Academic Computing training center and the faculty computer lab. These areas, known as *Faculty Academic Computing Technologies* (FACT), were consolidated and devised to fill the need of faculty needing necessary skills and access to technical resources. Services offered by FACT can be categorized into three areas: technology review, training and computing facilities. Each part serves a different facet of faculty needs, but ultimately all three areas intertwine to provide the best possible computing environment in support of instruction and research.

Technology Review: The *FACT Review* is a means for faculty to learn about new technologies, costs, comparisons and diverse uses. This FACT area also provides electronic access to resources and tools developed within Academic Computing. Basically, computing tools desirable to faculty are reviewed or created and presented. A review database contains details about the products, such as, technical specifications, screen captures, demonstration files, links to relevant websites and reviews for usability and performance. The database is available online for searching, categorizing and comparing reviewed resources. Hands-on demonstration sessions are scheduled in multiple, short time chunks for participants to experiment with and consult with the review staff. Resources are identified by request, as well as by staff keeping pace with the technology industry. The process and database development began fall 2000 after conceptual ideas were gathered from technology trade publications and electronic resources (e.g., *PC Computing's A-List*). With a student staff of two, more than five products have been examined as of November 2000. The fledgling review process has not yet been fully advertised, but approximately 25 faculty members have participated in three product presentations. The growing clientele of faculty have expressed positive feedback. Most have noted that the service simplifies searching for appropriate tools to utilize in and out of the classroom, and minimizes time spent learning a new product.

Training & Presentation: The *Academic Computing Training Center* not only presents the review seminars as noted above, but also presents training on integrated environments for hosting web-based courses and basic through advanced computer skills instruction. The classes are known as 'Class Shorts' and are offered on a wide range of current software, hardware and programming topics. Classes are time chunked in 15 minute to 2 hour blocks and are offered at varying times throughout the day, evening and weekends. Approximately 20 classes are offered every week with 10 seats available in the training center. Classes are also organized into beginning, intermediate and advanced task specific levels. The sessions can be taken individually or in series. The goal of this format provides the potential for learning whole applications or just needed tasks. The result of this concept is a flexible type of computer skills training to meet the needs of a wide range of faculty and students. The program, which has been in operation since January 1998, has served approximately 5,500 participants both in the Academic Computing training center or at 'on site' instructional labs on any of USF's four campuses. The program utilizes training materials developed in house, free resources online and purchased course materials (e.g., *ez-ref* software). Another growing area of the training center is "training on request." Faculty request an Academic Computing instructor to come in their classroom (either lecture based or hands-on computing) and teach a computing topic. Most popular topics include: campus-computing services for students, web development and campus email. Faculty have also used the training as an extra credit tool for students in their courses.

Computing Facilities: The *FACT Lab* contains hardware and software in support of faculty technology development. The student-staffed support lab contains equipment and resources that enable faculty to learn new computing skills while developing class content, or to focus on professional development. This faculty-only lab provides equipment, consulting, instruction and support for tasks such as online course development and image design, CD burning, web development, scanning and digitizing text. In addition, faculty members also receive assistance via email and phone on a wide range of computing related topics and technical troubleshooting. The lab currently operates with six workstations 40 hours a week. In a typical semester, approximately 50 faculty have utilized the lab with more than 200 visits.

All areas are thriving due to a highly skilled staff who enthusiastically embraces developing, working with and presenting new technologies. Currently, one full time staff member and seven part time student employees sustain this area of Academic Computing. It has been our experience, that the abundant and diverse types of output for our resources make faculty learning flexible, tailored, quick and effective. The collaborative efforts of the VITAL consortium also help to increase awareness of these great resources, and offer additional means to reach our faculty audience. As a result, the services provided by Academic Computing are continually evolving to meet the needs of our diverse population and the challenges for improved learning presented by emerging technologies.

Teachers, Technology and Staff Development: Planning for Sustained Change

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Abstract: Teacher staff development implies change. Staff development for teachers to incorporate a new technology into their classroom practice assumes that changes in student and teacher behaviors will occur in the form of teachers and students using technology in the teaching and learning process. Technology training for teachers often falls short of its anticipated outcomes. This paper will describe an instructional design model for teacher staff development to train teachers to integrate the Internet into their classroom routine. It is proposed that a staff development program designed to effect change in a participants' values and beliefs, provide knowledge of skills and strategies for immediate application in the classroom, and acknowledge the stages of development in the adult learning process will result in sustained change in classroom activities. The instructional design for the teacher staff development delivered through *Project REFLECT* offers such a model.

Introduction

With the emphasis on school reform at the forefront of many discussions regarding American schooling, the imperative for teachers to learn to use technologies for instructional purposes has accelerated. Pressure can be observed from a variety of venues including the government through legislation, accreditation organizations, school administrators and decision-makers, the corporate world, and the general public.

Unfortunately, current technology training for teachers is inadequate. Only one in five teachers report they are comfortable using technology. The U.S. government recommends schools spend 30% of their technology monies on training but in reality only 12 - 18% is used for that purpose. Training is often a one-shot event and frequently is conducted by non-educators. Clearly there exists a need to transform the way we plan for, design, and conduct technology training for teachers.

The focus of this paper is to describe an instructional design for a staff development program for classroom teachers to learn to integrate the Internet into their day-to-day classroom routine. The staff development instructional design is manifested in an inservice course in which teachers learn new skills, explore classroom applications, and reflect on their teaching philosophies and practices. Although the ultimate goal of the course is to enhance the learning experiences of K-12 students, the course is a professional development experience delivered to teachers. The staff development focuses on teachers' acquisition of technology skills, identification and development of classroom pedagogical practices using Internet technologies, and recognition and evolution of participants' values, beliefs, and practices regarding Internet-based instruction in the K-12 classroom.

Theoretical Foundation

Teachers' Developmental Stages

The scope and sequence of the curriculum design follows a model of stages of development. This approach is based on the research on teacher competence and experienced and expert teachers (Berliner 1988; Sternberg and Horvath, 1995), diffusion of innovations models (Rogers, 1995) and the ACOT studies of adoption of technology (Fisher, Dwyer, and Yocam 1996).

Sternberg and Horvath (1995) suggest an Expert Teaching Prototype with three primary features distinguishing the expert from the novice: Knowledge, Efficiency, and Insight. Briefly, the Expert Teaching

prototype suggests that experts bring more knowledge to bear in solving problems and do so more effectively and efficiently than do novices. Further, experts are more likely to arrive at creative solutions to problems than their novice counterparts. Sternberg and Horvath are quick to clarify that not every experienced teacher is expert. The expert teacher, then, is knowledgeable and has extensive accessible knowledge that is organized for use in teaching. The prototypical expert teacher has knowledge of the organizational context of the classroom and is able to adapt to the practical constraints of teaching. The expert teacher, according to Sternberg and Horvath, is able to perform the many activities of teaching with little or no cognitive effort. Finally the expert teacher is planful and self-aware in approaching problems and is able to derive solutions to problems through selective analysis of information (Sternberg and Horvath, 1995).

David Berliner describes his Pedagogical Developmental Stages, which focus on describing teachers within each of his five proposed stages. The stages characterize teachers in terms of their classroom processes, interpretation of classroom events, attention to feedback from classroom activities that affect immediate decision-making, and schema development. The five pedagogical development stages with a sample of defining characteristics are: Novice (deliberate, gaining procedural knowledge), Advanced Beginner (insightful, developing strategic knowledge, still unable to differentiate what is important), Competent (rational, sets priorities based on experiential knowledge, takes personal responsibility for classroom results), Proficient (intuitive, recognizes similarities within differing situations, analytic and deliberative), and Expert (arational and intuitive, non-analytical and non-deliberative, fluid and seamless).

Novice teachers, when confronted with new curricula or pedagogical approaches, begin with the literal, obvious aspects of the lesson or content. Teachers must first comprehend the content and develop a skill base with it before they can begin to apply the material to a learning situation. As teachers gain expertise, they begin to strategize how to teach with the new material and discover and create applications in the classroom for the new material. Later, teachers begin to focus on the interactions of the students with the content and teaching experiences and focus less on the "prescriptive" aspects of the curriculum. As teachers become accomplished with the given content, they re-work it into their personal instructional repertoire, building on it and reshaping it to accommodate their teaching philosophies, beliefs about learning, and student needs and interests. These developmental stages are not limited to beginning teachers. Indeed, experienced teachers, when faced with using or teaching a new curriculum or content also progress through the developmental stages.

This stage-oriented continuum loosely parallels some models for diffusion of innovation. Rogers (1995), for example, suggests five stages in the "innovation-decision process through which an individual passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (p. 163). The Apple Classroom of Tomorrow (ACOT) research also proposes stages of development for teachers to embrace technology for use as a routinized part of the curriculum, beginning with acknowledgement of the technology's presence, to using it for traditional teaching tasks, to adapting it to specific elements of the teaching and learning process and enhancing productivity, to using it effortlessly and with minimal cognitive expenditures, to creating new knowledge and learning experiences with the innovation. As teachers consider adoption of a new curriculum or content, they may be observed, over a period of time, moving through the stages of adoption as described by Rogers or the ACOT studies. This is significant for staff development planners. Since the purpose of staff development is to prepare teachers to adopt and embrace a new curriculum or pedagogical practice, understanding and considering the stages for adoption can enhance the staff development experience.

Rogers provides a model for the adoption of an innovation in his fourth edition, *Diffusion of Innovations* (1995). He purports that an individual's decision about an innovation is not instantaneous, but rather is a process that occurs over time. He suggests that there exist sequential stages in the process of innovation decision-making: Knowledge (awareness of the innovation and how it functions), Persuasion (a positive or negative attitude is formed about the innovation), Decision (decision-maker participates in activities that lead to a choice to either accept or reject the innovation), Implementation (innovation is put into use), and Confirmation (reinforcement for the innovation-decision already made is sought). Rogers' model is one of several that explain diffusion events.

The Apple Classroom of Tomorrow (ACOT) studies (Dwyer, Ringstaff, & Sandholtz, 1990) describe the evolution of teachers' use of technology in their classroom settings. Teachers in the study were provided with "constant access" to technology and were observed and interviewed over a period of time. The results of this early study contribute to our understanding of the process of teachers' integration of technology into their teaching practice. The researchers describe the instructional evolution in technology-intensive

classrooms in five phases: Entry, Adoption, Adaptation, Appropriation, and Invention. At the Entry phase technology existed in the teachers' classrooms. Teachers attempted to fit the technology into the familiar paradigm of textbooks, chalkboards, and workbooks. At this phase experienced teachers were faced with the same problems as novice teachers: discipline, resources management, and personal frustration (Dwyer, Ringstaff, & Sandholtz, 1990). In the Adoption phase, teachers were described as attempting to use the technology resources to supplement and support traditional instruction. During the Adaptation phase the major theme that emerged was productivity. Students and teachers took advantage of their knowledge of the use of technology to become more productive. The Appropriation phase occurred in the second year of the project. This phase is evidenced by teachers demonstrating an understanding of the technology and using it effortlessly to accomplish their work. The final stage, Invention, is described as a "placeholder" in which ACOT teachers can further develop and wherein new learning environments may be created (Dwyer, Ringstaff, & Sandholtz, 1990).

The research on expert teachers development and pedagogical development and that on adoption of innovations informed the instructional design for the curriculum for *Project REFLECT*. The staff development for technology integration curriculum follows a paradigm similar to the models presented above, starting with basic and familiar topics, providing the learner the opportunity to develop a skill base with Internet technologies. As the learner becomes familiar or proficient with the skills of the innovation, the staff development curriculum guides the learner into exploring and then developing teaching strategies for using the content and skills. The learner begins to develop his/her own applications for use of the innovation for use in the classroom and ultimately embraces the content as a basic element of his or her own teaching. This model recognizes that teachers typically go through stages or processes prior to embracing an innovative curriculum or pedagogical practice and that this process is not instantaneous, but rather, takes time. The curriculum is presented in modules or strands in a developmental fashion. A more expert individual may be comfortable starting later on the developmental continuum. A table (Table 1) summarizing the aforementioned models and the developmental stage elements of the staff development model for *Project REFLECT* follows.

Expert Teaching Prototype (Sternberg)	**Pedagogical Developmental Stages (Berliner)**	**Diffusion of Innovations (Rogers)**	**Evolution of Teachers Use of Technology (ACOT)**	**Internet Integration Staff Development Curriculum Model (Project REFLECT)**
Knowledge	Novice	Knowledge	Entry	Acquire basic skills and concrete knowledge
	Advanced Beginner	Persuasion	Adoption	Incorporate into teaching repertoire as a supplemental tool
Efficiency	Competent	Decision	Adaptation	Develop original practical applications
	Proficient	Implementation	Appropriation	Use routinely and evaluate the efficacy of its sustained use
Insight	Expert	Confirmation	Invention	Create new content and pedagogical practices with the innovation

Table 1

Motivational, Change, and Adult Learning Theories

The literature on change theory informs us that change in a pattern or practice will occur only after individuals change their normative orientations to old patterns or practices and develop a commitment to new ones (Chin & Benne, 1984, p. 23). "Changes in normative orientations involve changes in attitudes, values, skills, and significant relationships, not just changes in knowledge, information, or intellectual rationales for action and practice" (Chin & Benne, 1984, p.23). This strategy for change is referred to as normative-re-educative. This theory goes on to suggest that acceptance of a new set of values and beliefs usually cannot be brought about in a piecemeal fashion. A value system is a system and therefore must change as a system, not item by item (Chin & Benne, 1984). The theory rests on the assumption that the individual plays an a active role in the re-education process, interacting with the stimuli from the environment and making

decisions about how or whether to incorporate the new value among those existing. Lewin referred to this as life space (Marrow, 1977) in his Field Theory. Field theory is a motivational theory whereby the individual is seen as a system under tension (Patnoe, 1988). Tensions arise when there is a need or a want (Marrow, 1977, p. 34). Life space encompasses the needs, goals, unconscious influences, memories, beliefs, events of a political, economic, and social nature, and anything else that might have a direct effect on one's behavior (Marrow, 1977). Behavior, according to Lewin, is a function of the person and his environment. As a person attends to a tension and accommodates a new belief, value, idea, he begins the re-education process.

Effective re-education must affect the person being re-educated in three ways (Benne, 1984, p. 274). The person's cognitive structure must be altered (modes of perceptions, ways of seeing his physical and social worlds, and facts, concepts, expectations, and beliefs). The individual must modify his valences and values (principles of what he should consider doing and not doing, attractions and aversions to his and other groups and their standards, feelings in regard to status differences and authority, and reaction to different sources of approval and disapproval of himself). Finally, re-education must affect the individual's repertoire of behavioral skills. It takes time and effort in training for a group to learn a method of experimental inquiry where their own feelings, perceptions, commitments, and behavior are the data to be processed in the inquiry (Benne, 1984, p. 227). Extensive hands-on experiences do not automatically create correct concepts or knowledge (Benne, 1984).

The idea that deeply held beliefs can stand in the way of change is not new (Dwyer, 1990, p. 36). Teachers' beliefs about instruction and schooling are important factors that underlie the institution's resistance to change (Dwyer, 1990). Fenstermacher (1979) suggests that normative-re-education can be accomplished by getting teachers to reflect on their beliefs in light of reasonably objective feedback and on their actions and the consequences of their actions. First, however, Dwyer (1990, p. 37) maintains that teachers must see and understand the connection between their beliefs and actions and they must also be aware of alternative belief systems.

Argyris and Schön (1974) suggest that individuals (or systems) may have two sets of belief systems or theories that guide their actions: theories-in-use and espoused theories. Theories-in-use are part of the life world that are taken for granted and espoused theories are those theories or ideas that individuals say they believe (a smokescreen for their real values and motives) (Young, 1990, p. 132). A problem may occur when the ideology of the organization or system is incongruent with the real motives and goals of its participants (Young, 1990). Theories-in-use must be in sync with espoused theories (Argyris & Schön, 1974). Advocates of change tell teachers and administrators to abandon their conceptions, meanings, roles, and behaviors that have given meaning to their professional life for those values, beliefs, behaviors, ideas imposed by the change advocate (Marshak, 1996). This may force educators to adopt espoused theories, but it seems unlikely that one can abandon one's entire belief system on command.

"Most educators, parents, school board members, and bureaucrats significantly underestimate the complexity of school change because we focus almost exclusively on the external, rational, and technical elements of the process" (Marshak, 1996, p. 72). When we focus on the rational, we ignore the emotional experiences of change. Change theory, particularly, normative-re-educative change strategy, instructs us to attend to the whole system to effect change. Few changes will occur in schools and in practice unless faculty, students, and practitioners also become more aware of their espoused interpersonal theories and their interpersonal theories-in-use and until they integrate this kind of learning with the learning of technical theories and theories-in-use (Argyris, 1974, p. 180).

Knowles (1988) reminds us that adult learners are quite different from child and youth learners. He adopted the term "andragogy" for the instructional approaches employed with the adult learner in mind (Knowles, 1988, p. 37). The instructional setting for adult learners is typically more informal and involves the learners in the teaching and learning and evaluation processes (Knowles, 1970). The adult learner's motivation to learn is intrinsic; the timing of learning is varied, as are the groupings. The adult learner's rich experiences are often brought to the instructional table.

The Instructional Model

Design of the Course

The *Internet Classroom Teachers Training Course* (*ICTTC*) offered to teachers through the funded grant, *Project REFLECT*, is a comprehensive curriculum designed for K-12 classroom teachers to learn to effectively infuse the Internet into their regular curriculum. The staff development model weaves the

technical knowledge and skills a classroom practitioner needs with pedagogical practices, organizational approaches, evaluative strategies, and the aims of the regular curriculum. These cognitive structures and behavioral skills are approached and brought about as each individual reflects on her or his own philosophical perspective and values, beliefs, and practices about teaching and learning. The design of the staff development model is based on the assumption that people learn best and retain more when they actively participate in the teaching and learning experience.

Elements of the Course Design

The course has three primary desired outcomes: 1) the acquisition of Internet technology skills for use in the classroom, 2) the development of pedagogical practices to incorporate the technology innovation, and 3) the identification and evolution of the course participants' values, beliefs and practices regarding the technology innovation. To this end the course content is divided into six modules or strands. The instructional design of the course provides for beginning with basic and familiar topics to develop a skill base and then moves toward the development of teaching strategies with the technology innovation. The course assignments through which the skills and pedagogical practices are developed have direct application for classroom practice. Discussion of issues, concerns, philosophies, and theories that underpin the Internet technology in the classroom are woven throughout.

The scope and sequence of the six modules acknowledges the stages of development of teachers adopting a curricular innovation. It presents the cognitive elements of the course in a simple to complex approach, allowing and encouraging participants to work the new content into their own teaching practices and to ultimately create new ways to use the content. This approach is consistent with and supportive of the Expert Teaching Prototype, developing the knowledge base, accommodating it into the classroom practices, and ultimately applying it fluidly and effortlessly into the teaching act.

Course participants generally work in pairs and are involved in mentoring one another in the *Project REFLECT* model - in class and through electronic dialogues outside of class - and are responsible for planning and conducting staff development activities for colleagues in their own schools using a "train-the-trainer" approach. Although the teachers generally move through the Pedagogical Development Stages over a long period of time, the experiences of students as teachers and teachers as students support the Pedagogical Development Stages and help to expedite the process. Course participants, informally, through the accomplishment of course activities and assignments, have the opportunity to mentor one another or to conduct mini-lessons for one's peers. It is evident through observation of these spontaneous and planned lessons that participants are tapping into their newly acquired well-organized knowledge base to efficiently solve problems or accomplish learning goals. In a more formalized activity, participants design and implement staff development activities related to the course content for teachers in their schools. Mentoring acknowledges the rich backgrounds that each adult learner brings to the course and also provides the opportunity to try out one's new knowledge and pedagogical practices in a "safe" environment, building content and pedagogical knowledge and assessing the "fit" of the innovation into one's own value system. The breadth and depth of the course curriculum and the manner in which the content is presented are key factors to the success of the ongoing and recurring use and further development of the content by individuals. Learners learn at different rates and bring a myriad of experiences, backgrounds, and beliefs to the instructional setting; therefore, the instructional design of the staff development course must consider these varied learning rates and stages and provide for learning to continue after the formal instruction of the course has ended. Course participants have an opportunity to return to the course resources (website and curriculum guide) long after the course has ended. They still have available all course resources after they individually have had the opportunity to consider the adoption of the curricular innovation or have developed the content or skill base to the degree whereby they can effortlessly accommodate it into their instructional repertoire. Too often staff development programs assume the training (and therefore learning) is ended at the conclusion of the session.

For sustained change to occur or for an individual to consider adopting a change, however, the individual's value system must be affected. Demonstrating knowledge of the innovation or observing a pedagogical practice associated with the innovation is not, in and of itself, sufficient to ensure real and sustained change. The staff development program must effect a change in the participants' value systems or attitudes. As *Project REFLECT* course participants acquire new knowledge and skills and accommodate these into their own classroom practices, they are provided opportunities to reflect on their new knowledge, ideas, and practices. These reflections occur informally in class and through electronic communications with

classmates as well as individually through a form that is completed on the web by each participant at the end of each module. This reflective activity is one that provides a richness in the staff development experience, providing course participants with an opportunity to examine their values, beliefs, and philosophies and to analyze them for fit with the instructional technology experience. Participants also reflect on their own teaching and learning experiences and often develop strategies to enhance their own teaching and their students' learning.

Conclusion

The staff development model used in *Project REFLECT* for classroom teachers' Internet instruction considers the literature on teacher stages of development and change, motivation, and adult learning theories. The model begins by presenting basic and familiar topics to develop a skill base, moves toward the development of teaching strategies that have application for classroom practice, and encourages innovative uses of the new knowledge and skills. Discussion of issues, concerns, philosophies, and theories that underpin the technology in the classroom are woven throughout. Teachers are actively engaged in the learning process and build their new knowledge on their existing schema. Teachers reflect on their values, beliefs, and behaviors regarding use of the Internet technology innovation in their classroom practices. Staff development such as this, that affects the entire system, the whole person, can result in sustained change.

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Teaching on the Web: A Constructivist Approach to Faculty Development

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I. Introduction

One of the affordances of the new online learning movement is the opportunity it presents to reexamine the ways in which some aspects of traditional instruction can be re-conceived to operate effectively in the online asynchronous environment. This technological shift -- from knowledge being fixed to a certain time and place, to knowledge being accessible at anytime and at anyplace -- creates the potential for a change in the way learning is transacted from those who provide information (i.e. teachers or facilitators) to those who receive it (i.e. students).

This article focuses on the training of teachers of higher education by means of a two-week workshop -- "Teaching on the Web: A Nuts and Bolts Approach" -- in online pedagogy and facilitation techniques. This workshop is used as the intervention to examine what the effects are of being an online learner on future online teachers.

Users were notified of the course through online advertising and email. Almost 90% of the students indicated voluntary participation. In the end, the class was well attended with 57 students on the official role; 44 completed the pre and/or post-course survey, a 77% completion rate. This group is the sample examined.

II. Results

This article sets out to answer the question whether or not exposure to the course had an effect on the forty-four sampled participants.

Hypothesis 1 - The extent to which respondents rethought their teaching practices was positively related to the increase in exposure to the course. This hypothesis was tested based on students answer to one survey question. *From 0 (not at all) to 10 (very much), please rate the extent to which this class helped you rethink your teaching practices?*

Using a linear regression model, comparing the dependent variable (mean= 5.74, SD=3.71) to the three independent variables, the results indicate a highly significant change in the sample's rethinking their teaching. The results are at the .000 level and the over half the variance (r square=.531) is explained by

these three indicators. This confirms that the two-week intervention was successful in its aims of having teachers reexamine their ways of teaching when faced with the online medium. Total hours of exposure are the strongest indicator (partial p=.007), and more times students exposed themselves to the course and related materials, the stronger the effect.

Comparative changes in teachers' philosophies are difficult to assess in a two-week intervention, and the author does not claim that the course fundamentally changed teachers approach to instruction. No pre-course data measuring teaching philosophies was gathered. However, qualitative data from the discussion board, students' posts, and materials generated, and the result of hypothesis 2 indicate that the shift was more in line with constructivist methodology.

Hypothesis 2 - The extent to which attitudes towards various aspects of online teaching and learning was positively related to the increase in exposure to the course. To study attitudinal change, the investigator devised a 17-item likert scale ranging from strongly disagree to strongly agree.Each attitude indicator, that is the difference between pre and post individual attitude means, was compared. Out of the 17 attitudes, three proved to be significant to the .05 level in a paired sample test.

They were:

Online distance learning courses encourage more student participation than traditional face-to-face courses. (p=.005)

Online distance learning teachers and students can produce learning outcomes better than traditional face-to-face teachers and students. (p=.013)

Online distance learning courses have more student-to-student interaction than traditional face-to-face courses. (p=.014)

This finding is interesting and helps define what type of rethinking was taking place. Rethinking may be seen more in the direction of increased student participation and interaction. Students believed that learning outcomes derived from these practices were also efficacious. This finding provides additional validation of the course and its objective.

Hypothesis 3 - This measure examined whether the frequency of the distribution of pre and post scores of a 15 question multiple-choice exam. Using a paired sample t-test, these results are highly significant (p=.000). The mean difference scores (pre = 4.68, post mean = 8.16) shifted upward signaling an increase in knowledge gained.

This shift is not completely explained by the course intervention. This means that the three measures, total hours, logins, and posts, do not explain the full treatment effects. Perhaps, exposure to the course may not have resulted in all the learning gain. The course was not designed to teach for the test.

Hypothesis 4 - The question used to investigate this change was: *Should teaching online distance learning courses be a part of regular faculty work?* The difference in mean scores pre and post were compared to produce the dependent variable. Using a chi square test, a significant result was found (Chi Square = .036). The results can also be seen by the means of those who switched from before the course, indicating it was different from regular faculty work, to after the course, indicating it was the same as regular faculty work. The average means of the "different" group is 16 hours of course exposure while the "same" is 24. The six people that switched were exposed over 22 hours, higher than average.

These results point to the integration of the online teaching experience with the traditional one. Teachers who have more training feel as if the online world is an extension of their job, and not something unique or alien. These findings concur nicely with the Taylor and White survey (1991) of an Australian University's faculty attitudes toward distance learning, and Pierpoint and Hartnett study (1988) of American programs, which concluded that the art of teaching and interpersonal interaction were highly valued in job satisfaction. [1] [2]. Lonsdale indicates current faculty reward structures show an over-reliance on extrinsic rewards and a lack of congruence between the established reward mechanisms and intrinsic motivation. Intrinsic motivation is characterized by the desire to participate in an activity where the reward is the act of participation itself. [3] Constructivist-based teacher training courses may be a vehicle to stimulate the intrinsic motivations of classroom-based faculty members as they go online to teach.

III. ALN and Constructivism

As a theoretical approach, the course employed a constructivist philosophy in its design. Constructivist environments start with observations within a world of authentic artifacts rooted in authentic situations. Students, while accessing various materials, construct ongoing interpretations of their observations, and collaborate with their peers. Finally, students serve as coaches and teachers to each other to show their mastery of what they learned. Researchers have pointed out the connections between the online medium and the constructivists' framework of teaching and learning. [4] [5] [6] They claim that the learning methodology is as important as the instructional technology employed. There also seems to be a

connection between the pedagogical tendency of the teacher and their Internet use and valuation. The more constructivist the orientation, the greater the teachers' average use of the Internet and the more positively they viewed its incorporation into instruction. [7]

In accordance with this research, the choice of instructional design for the training course was a deliberate decision; all attempts were made not to make an online teacher training course, but to make a *constructivist* online teacher training course. Instead of outcome, the class facilitator focused all his energies on process and tried to facilitate the students' own ability to acquire knowledge.

What are the facilities provided by ALN that make implementing the constructivist approach more feasible? To examine this, the instructional principles of a constructivist environment need to be more rigidly defined. Piaget's processes for knowledge construction are:

I. Assimilation - Associate new events with background knowledge and prior conceptions.

II. Accomodation- Change existing structures to new information.

III. Equilibrium – Balance internal understanding with external "reality" (e.g. other's understanding).

IV. Disequilibrium – Experience of a new invent without achieving a state of equilibrium. [8]

The table below maps the Piaget's four processes involved in the construction of knowledge, the principles involved and how they map to an ALN (adapted from Akyalcin, *Constructivism – an epistemological journey from Piaget to Papert*). [9]

Processes	Instructional Principles	ALN Components
Assimilation	Gauge the learner's previous knowledge and experience.	Pre-test, Introductory Posts
Assimilation	Orient the learner to his learning environment (LE).	Broadcast Emails, Syllabus, Resources To Do lists, Glossary, Course Information, FAQ, Synchronous Chat
Assimilation	Solicit problems from the learner and use those as the stimulus for learning activities, or establish a problem such that the learners will readily adopt the problem as their own.	Course Testing and Revision, Class Content, Synchronous Chat, Online Lectures and Readings, Non-graded, starter Activities, Facilitative Questions
Assimilation	Support the learner in developing ownership for the overall problem.	Discussion Forum feedback by other students' and facilitator
Assimilation	Anchor all learning activities to a larger task or problem. The learner should clearly perceive and accept the relevance of the specific learning activities in relation to the larger task.	Individual Unit activities leading to Team Project

Accomodation	Design the LE to support and challenge the learners' thinking.	Modularize Content so as to scaffold learning, Behavior Modeling by Facilitator, Quizzes for reinforcement Compare and Contrast Activities, Facilitative Questions, Discussion Forum feedback by other students' and facilitator
Accommodation	Design the task and the LE to reflect the complexity of the environment in which they must function after the learning has occurred.	Online Course Delivery, Modeling of Course Structure and Components, Team Project
Accommodation	Encourage testing ideas against alternative view and alternative contexts.	Discussion Forum, Modularize Content to introduce new concepts, Compare and Contrast Activities, Interactive Essay, Facilitative Questions
Equilibrium	Design an authentic task. An authentic LE is one in which the cognitive demands are consistent with the demands in the environment for which the learner is being prepared.	Team Projects
Equilibrium	Provide an opportunity for reflection on both the learning content and process.	Facilitator evaluation of team projects, Auto-marked quizzes, Open student evaluation to instructor
Disequilibrium	Provide an opportunity for changing and enhancing, drafting, and redrafting.	Unit summaries of student discussion
Disequilibrium	Challenge misconceptions.	Students' and Facilitator's Feedback, Project Gallery, Post-Test

VI. Results

In summary, results indicate that the teachers shifted towards a more constructivist orientation, valuing increased interaction and communication. Along with this change, teachers also gained some knowledge about distance education. This combination of content and experience provides dual reinforcement validating the course experience.

After exposure to the course, the respondents felt that online courses offered more student participation than traditional face-to-face courses, and that online courses have more student-to-student interaction than traditional face-to-face courses. Moreover, teachers saw the online medium as more of an extension of their faculty work. That is, teachers saw teaching is their job and doing it online was now part of their job. This would indicate that the central issue for the future of teachers is more about training and less about the correct reward structures.

Institutions should take note that as their faculty force becomes more empowered using this online medium; they will want to use it. After all, teaching is sometimes referred to as a calling more than a

regular vocation, and strong inner motivations need to be valued and recognized. The workshop's integration of method and medium is, the investigator claims, the primary reason for the positive results in changes in teachers' attitudes and thinking about educational practice. This reexamination of existing practices and adoption of ones more appropriate to the online learning environment is one of the affordances (i.e. change catalyst) of the Internet.

These findings buttress this corporatist, constructivist view of learning as contributing to deeper understanding that may affect behavioral change. From posted messages, activities, and surveys, the data showed that the ability to connect with others knowledge and experiences, as well as, their feedback is essential.

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Parts of this paper are published in the Journal of Asynchronous Learning Networks and are republished with their permission. To review course materials, please see the following URL < http://wellspring.isinj.com/teachinfo/>.

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Faculty Development for ACTIVE Learning

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Abstract: The ACTIVE project addresses the need to improve the preparation of preservice teachers through providing instruction that models the integration of technology into classroom delivery. The focus of this project is ACTIVE—Authentic, Competency-based, Technology-enhanced, Integrated, Versatile, and Evaluative—curriculum. This project was funded by a Title II Teacher Quality sub-grant and began in fall 2000. Initial results from the first six months of operation will be shared. The researchers are also seeking information on similar projects.

Introduction

Making use of the *Teacher Preparation StaR Chart: A Self-Assessment Tool for Colleges of Education* (CEO Forum, 2000) Western New Mexico University (WNMU) has an overall ranking as a Developing Tech institution. The low ranking shows a strong need for a university-wide program to meet the technology needs of the preservice educators attending our institution. At the same time, in an effort to enhance teacher quality, the state of New Mexico (NM) has revised the competencies upon which its teacher preparation programs are designed. The ACTIVE Learning Project was designed to begin meeting both needs.

The Project

At the October 1998 Western Interstate Commission for Higher Education (WICHE), a panel of four university presidents emphasized the necessity of modeling the correct application of teaching strategies that include the integration of technology. Effective preparation of preservice teachers requires a college experience where the use of technology is modeled by professors in all subject areas. Technology infusion, by itself, does not improve student achievement. Desired changes take place only when the technology is correctly used.

Five ACTIVE Teams have been formed to meet the need for a connected learning community. Each team will include a School of Education faculty member, a teaching field faculty member, a preservice teacher, and a clinical faculty advisor from local public schools. Each graduate of the Teacher Education Program at WNMU must declare a "teaching field" which requires a State Department of Education approved 24-36 credit hour sequence of courses, i.e., language arts, math, science, reading, bilingual, social studies, and fine arts. While taking these specific courses, the student also must take a sequence of professional education courses. Field experiences are included at three levels: Exploratory, Curriculum, and Practice Teaching. The students chosen for ACTIVE Teams will be mid-way through the Teacher Education Program. The connection between the ACTIVE Teams and the Clinical Faculty will make a public school classroom available for university faculty and preservice teachers to use their skills as

they introduce curriculum designed through the project. Virtual connections will be established for team communication (Berg, 1999).

The age of most of the facilities at WNMU and the need for discussion and learning to take place 24 hours a day, and 7 days a week, necessitates the use of portable equipment to provide technology for this modeling (Young, 1997). ACTIVE teams are being provided laptops for this purpose. Chaffee (2000) describes the value of a similar initiative in North Dakota. The computers will remain university property and will be checked out to the faculty members for the duration of their participation in the project. Due to the fact that the majority of students attending WNMU cannot afford home computers, three laptop computers will also be made available to the student members of ACTIVE Teams on a shorter-term checkout basis. Faculty will be required to use WebCT for their courses and all ACTIVE participants will be included in a special WebCT group for collaboration and discussion (Biggs, 2000).

The initial activity of each ACTIVE Team was to set team training goals based upon the twenty NM Technology Competencies. In this way, the personnel of the project are able to design both individual and group sessions that meet the needs of the individual participants and teams. For training to be most effective, it must meet an immediate need of the trainee. The participants are also designing rubrics for the NM competencies (Krueger, Hansen, and Smaldino, 2000; Kemp et al., 2000).

This project is supported through the creation of an Expertise Center for ACTVE Learning. This space will house the personnel hired by this project, along with the technology and resources needed by the ACTIVE participants both for training and curriculum development, and will be fully integrated into the university's network so participants can access the Internet and printers. The Expertise Center will be available "to train faculty to use technology, show them how to use it effectively in the classroom, and offer just-in-time technical support" (Rogers, 2000).

The funding for the project was received in September 2000, delaying the establishment of the project. Three teams have been created by early November with two more to be created soon. Anecdotal evidence will be shared with conference participants.

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Classrooms Under Construction: A Video Series

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Abstract: Professional development that supports teachers as they create constructivist learning environments supported by technology allows them to construct professional knowledge about pedagogy, content, and technology, as well as strategies for managing a changing classroom environment. By providing the very experiences promoted for constructivist learning environments in the classroom, through professional development, it is possible that teachers will confront their "theories in use" to enable them to create learning experiences appropriate for the children of the Information Age. For this purpose, the Technology Assistance Group at the Southwest Educational Development Laboratory created six videos that portray several K-8 classroom teachers as they grew through the process of creating constructivist classrooms supported by technology. Featured in these videos are vignettes of students, teachers, and principals who share their experiences in learning, supporting, and the use technology to change teaching practices.

Creating a Vision With Technology

These two videos were produced in conjunction with a three-year project that involved 150 teachers in six site schools across five states. They were designed to be used as professional experiences for in-service and pre-service educators and These two videos provide several vignettes of students and teachers using technology in rural school districts comprised of low income families. Suggestions for using these videos are included in the various activity modules found in the *Active Learning with Technology* (ALT) professional development portfolio.

Engaged Discoverers: Kids Constructing Knowledge with Technology. This video depicts K-12 classrooms in sixteen schools throughout the Southwest where a variety of technologies support student-centered approaches in the classroom. Innovative teachers create environments where students collaboratively solve authentic problems using technology as a tool and new roles for students and teachers encourage kids to become "engaged discovers." This video is used in the *Creating a Vision* module in the ALT portfolio where teachers watch how other teachers use technology in the classroom. This is also an excellent video for school administrators and interested community members to help them create a vision for technology. Total running time - 28:25 minutes.

Classrooms Under Construction: Integrating Student Centered Learning with Technology. This video portrays students, teachers, and principals from culturally divers schools across the Southwest in the process of constructing learner-centered classrooms using technology. Students, teachers, and administrators learn as well as teach, sharing and learning new ideas, new technologies, and new strategies for building knowledge that relates to their own experiences and to the world they inhabit. This video can be used in the *Examining Our Practice* in the ALT portfolio where teachers look at their own classrooms to identify characteristics of learner-centered activities supported by technology. Teachers in this video describe how they have learned to use technology in their classrooms and how they have changed their instructional strategies. Total running time - 24:20

Classroom Episodes

These videos were produced toward the end of the two years of the SEDL project and show individual classrooms with students and teachers actively involved with technology. All of these videos are available by contacting the Southwest Educational Development Laboratory at [www.sedl.org] or by contacting any of the authors.

2nd Grade Classroom Episode: The Desert. This classroom video episode depicts an interdisciplinary unit of study about the desert in a 2nd grade classroom. A variety of technologies are used to support student-centered approaches in this classroom. Total running time: 18:45 minutes.

Reading Buddies: 1st and 2nd Graders Learning Together. This classroom video episode depicts how first grade and fifth grade students learn together as they create an electronic alphabet book for the younger children in their school. Total running time - 18:30minutes.

6th Grade Classroom Episode: Collaborative Language Arts. This classroom episode depicts students engaged in several collaborative language arts activities, including writing and editing autobiographies, sharing book reviews, crating a myth, and writing free verse poems. A variety of technologies are used to support these activities. Total running time: 17:03 minutes.

9th Grade Classroom Episode: Spanish Travelers. This classroom episode depicts small groups of students working on a project-based learning activity. Their task is to find pertinent information and create a travel brochure for selected Spanish speaking countries. A variety of technologies are used to support their work, including computers, the Internet, digital cameras, and word-processing and database software. Total running time - 14:00 minutes.

Availability

The professional development modules from the *Active Learning with Technology* portfolio (ALT) mentioned earlier, can be downloaded from the following website: [http://www.sedl.org/tap/profdev.html] and all of these videos are available by contacting either the Southwest Educational Development Laboratory at [www.sedl.org] or any of the authors.

Creating a Culture Shift: Establishing a Technology and Learning Center

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Introduction

A culture shift is a change in the rules of conduct. The College of Education (COE) at the University of Missouri-St. Louis needed a cultural shift. With the university certifying over 500 teachers a year, these students need to be technologically literate. The evidence was that the students were not being adequately prepared to integrate technology into the curriculum. Pressure for technologically literate graduates was coming from the Missouri Department of Elementary and Secondary Education and from school districts. Students at the university also have practicums in technology rich classrooms and they may end up working in a technology rich classroom or MINTS* classroom. In the 21st Century, students hired from the University of Missouri-St. Louis must know how to integrate technology.

A number of indicators confirm that COE faculty—65 full time and more than twice that number of adjunct faculty need to increase their use of technology. Campus Computing reports that COE faculty made fewer requests than Arts and Science faculty for lab use; they made fewer requests for Internet connections, and they made no requests for use of the Computer on a Stick Classrooms.** Additionally, the computer classrooms available for faculty to use for classes were not fully scheduled.

One of the roles of Campus Computing has been to support the use and operation of technology in the COE. It also made sure that a faculty member's computer worked. Faculty was expected to take responsibility to learn applications, but they received no guidance for integrating that application into their courses. Additionally, when faculty did use technology in the classroom and a problem with integration arose they received little or no support since no group had been identified to help with the integration of technology in courses. This environment was one in which technology use was not encouraged. The faculty was on its own to find support.

Change

With impetus from the Dean of the College of Education, a culture shift is being undertaken for the use of technology in instruction. The centerpiece of the cultural change is the establishment of a technology and learning center. The proposed shift is both the mission of the center and a question. Can a technology culture change take place through a properly implemented technology and learning center?

With the Dean's push for change, many faculty were still missing adequate institutional support to develop the knowledge, competence and confidence to integrate technology. Many faculty had expressed a desire to incorporate more technology in their courses, but they needed support. They needed a change in culture so new ideas and approaches could be tried with help and assistance.

Shift

The Dean of the College of Education communicated numerous times his expectation that faculty should use and integrate technology. The Dean also began communicating messages and memos by e-mail only. Networked computers were installed in all faculty offices. Each faculty member was connected to e-mail and the Internet. File space was available for storage of large documents. Printers were connected to the network and many faculty had individual printers.

Through the leadership of the COE Dean and with the support of the Chancellor, funds were secured to establish a technology and learning center, to endow a chair in technology and learning, to hire an additional faculty member,

* Technology rich classrooms or MINTS (Multimedia Interactive Networked Technologies) classrooms are supported by the State of Missouri

** Computer on a Stick are classrooms with an internet connected computer and a projection system

and to reallocate funds within the current COE budget for staff and annual equipment upgrades. The E. Desmond Lee Technology and Learning Center, named and funded by a visionary leader in the St. Louis business community opened its doors on April 7, 2000. The center's purpose is to bring the college and general education community from limited and rudimentary use of technology in instruction to ubiquitous use.

From the beginning, the center was organized and operated very differently from all other computing facilities on campus. The Center is intended to be a place to "hang out." An emphasis is placed on having as few rules as possible and having staff that provides a level of assistance that encourages faculty and students to use technology. Staff members greet clients and encourage them to ask for help. The staff has been trained to provide useful service in a pleasant manner. Personnel have been asked and trained to provide a very high level of client service. The room--originally a chapel with a mosaic tile ceiling—is designed for individual and collaborative work. The 70--plus workstations are arranged for a variety of functions. Single stations may be used for individual work. Others are arranged in clusters for group projects. A seminar room is available with a SmartBoard™ with connected workstations. A presentation and discussion area enables faculty and students to give seminars. A "cyber lounge" is set up for informal gatherings. Signposts and friendly barriers direct students and faculty. Wireless computers are available to take in the courtyard or to use anywhere in the center. Digital cameras are available for on and off campus use. Support for faculty is immediate and appropriate. Food and drink are unrestricted.

Staff are instructed to work through a problem until it is solved. If the staff member cannot solve the problem, he or she must find another staff member who can. The first staff member is expected to stay with the problem and learn the solution as well. An example of this is the faculty member who came with a 150-page dissertation that needed to be scanned into a word processing and PDF format. The staff member quickly realized that scanning the documents one page at a time could take many, many hours. By seeking the assistance of a second staff member who knew how to use the DocuCenter, the dissertation was scanned into both formats, stored in a folder and e-mailed in about 30 minutes. The first staff member also learned the procedure. If no one is able to solve a problem, the solution becomes a staff project. In other words, staff is encouraged to look at problems as opportunities. Staff is encouraged to speak in non-technical terms and avoid jargon. The training and discussions at weekly staff meetings focus as much, if not more on serving clients as on learning the technology. Staff is chosen for having an aptitude for teaching themselves technology applications, largely through online tutorials.

The center programs that help faculty integrate technology in the classroom are numerous: workshops for faculty, demonstrations by teachers in the field, faculty work groups, discussions, and individual consultations. One positive result that happened through an individual consultation was a faculty member's decision to place all of his paper handout materials in digital folders for student access by computer, instead of copying and selling the paper documents in the bookstore. This has allowed him to use the materials differently in class. The faculty member who characterizes himself as a limited user is now instructing professors from other sections of this course on this technology use. This example, we believe, illustrates a cultural shift. The new culture being created intends to support and respect faculty in their use of technology at their individual comfort level.

The center is designed as a technology hothouse. Faculty and students can be nurtured in their growth and experiences with technology, and new ideas can be tried out in a supportive environment. The staff in the center is trying to help faculty see technology as enabling not intimidating.

Challenge

Establishing and sustaining a new of culture for educational technology is a large task. It takes a properly functioning infrastructure, a support system and the expectation that technology can and will be integrated in the curriculum. Through the leadership of the E. Desmond Lee Technology and Learning Center, faculty now have the opportunity to develop the knowledge, the competence and the confidence to integrate technology. The challenge is to build a seamless integration of technology in the college curriculum.

Effective Technology Staff Development: A Grass-Roots Approach

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Abstract: Training to support the integration of technology into the curriculum can be difficult. Research suggests that on-site, just-in-time instruction is more effective than one-time workshops in facilitating meaningful technology integration into the classroom. The Teacher Technology Leadership Academy in the Archdiocese of Indianapolis is a grass-roots approach to staff development in technology. It is a cost effective, train-the-trainer approach that provides research-based staff development in technology for classroom teachers. This model can be transferred to any school or district.

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Schools in the United States are currently receiving mixed marks for integrating technology into the classroom. According to the *1998 CEO Forum Study*, of 80,000 public schools surveyed nationally, 54% of schools were considered "low tech." Only 6% of schools were found to be "on target." The Archdiocese of Indianapolis faces many of the problems of the public schools with respect technology. The archdiocese consists of 71 parish-supported schools with nearly 25,000 students and 1,500 teachers in grades K-12.

It is not difficult to find the source of the problem of integrating technology in schools. Despite the fact that many current teachers are not prepared to use technology in their classes, they do not receive the kind of support they need. An average of $132.57 per student was spent on educational technology in 1999-2000 (Quality Education Data, 2000). Only $6.86 of this amount (5% of the total) was spent on professional development.

There are many different staff development models currently in use to help teachers learn the skills they need to use technology. According to Maurer (1998), there are three main staff development models for technology: the after-school workshop, the all-day, off-site workshop, and conferences. A common type of technology training occurs in after-school workshops. After the teacher has completed a day of work, they attempt to learn a new complex skill which they will not be able to immediately practice. Teachers rarely retain and use what they have learned under these conditions (Maurer, 1998).

Another common method is an all-day, off-site workshop. In Indianapolis, many teachers take advantage of the technology workshops offered at Butler University. While these programs are in-depth and helpful for teachers learning new skills, there is no follow-up or support after the workshop.

Conferences expose teachers to new ideas, but there typically is limited hands-on experience and discussion of ways in which these ideas could be transferred to their own classrooms. While each of these methods can be successful with a limited number of participants, none of them lead to significant, long-term benefits in the classroom (Maurer, 1998). Given the small staff and budget, it was important for the Archdiocese of Indianapolis to develop a program that was both efficient and effective.

To address the technology training needs for the Archdiocese of Indianapolis, the *Teacher Technology Leadership Academy* (TTLA) was created. This "train-the-trainer" model, based on the work of Malcolm Knowles (1984), has been effective in helping teachers not only enhance their software skills, but also to

find ways to integrate technology into the curriculum. Each year, the TTLA is comprised of a cohort of 16 classroom teachers chosen based on their willingness to try innovative instructional strategies rather than their computing skills. The group meets six times during the school year. Each session is comprised of instruction in a new software tool (database, spreadsheet, etc.), laboratory time for practicing new skills learned, time to develop a lesson for the classroom using the tool, and time to work with their peers. One key aspect of the work sessions is that each participant works on a project that will be useful to her right away. This philosophy of working on immediately applicable skills (just-in-time learning) makes the learning relevant, practical and draws on teachers' own experience. By the end of each session, each participant leaves with software help sheets, a lesson plan, and a project created with the software tool. Most importantly, participants are provided with all the required materials to prepare other teachers to implement technology effectively.

During two years of operation, the participants of the TTLA have met with great success. Findings from pre- and post-tests of both attitudes towards technology in the classroom and skills learned indicated significant improvement (approximately 20% increase each). Twenty-four teachers (8 the first year, 16 the second) have completed the program and are currently implementing technology-infused lessons in their classrooms and training other teachers. As a result of the TTLA program, participants have designed and implemented a total of 142 lessons in the classroom, and seventy-three training sessions were offered by the participants for other teachers in 1999-2000 alone.

TTLA is more successful than many of the models noted above because of its reliance on the adult learning theory (andragogy) developed by Malcolm Knowles (1984). Knowles provides several guidelines for adult learners that were incorporated into the TTLA model. He asserts that instruction for adults should be different from instruction for children (pedagogy). Adults learn for different reasons than children and have far more life experiences to consider when planning instruction. He argues that adults need to learn through real-world experiences rather than textbooks or theory. Adults need to know the practical value of what they are learning. They approach learning more as problem solving. And adults learn best when the knowledge is of immediate practical value to them. The TTLA is designed to incorporate the principles of andragogy directly into the instruction.

Some commercial programs also incorporate many of these principles. While expert consultants from computer training companies and online software training provide an excellent source of teaching content, there are many advantages to creating a grass-roots program like the TTLA. We have found that teachers respond more to other teachers than a technology coordinator or an outside consultant. Teachers have credibility and familiarity with their peers (Maurer, 1998). The participants in TTLA know that the instructor knows what it is like to face the challenges of using technology in the classroom. The peer relationship is also important, not just with the instructor, but between students. Participant evaluations consistently highlight the value of working and talking with other teachers. They value the exchange of ideas and techniques sometimes more than the instruction itself. This cohort group then provides an important support system for participants as they meet with successes and challenges in the classroom. Perhaps most importantly, with a grass-roots system, the innovation can diffuse much more quickly as TTLA graduates work with their own staffs and other schools.

In developing grass-roots technology training programs, additional key items have proven to be helpful. First, it is crucial to recruit the right participants to be effective trainers. Interpersonal skills, enthusiasm, and an ability to explain things well are all important considerations. It is also important to train the trainers to work with other adults. In addition to all the handouts and presentation materials, TTLA participants leave with a good understanding of andragogy. It is equally important to support the trainers as they begin to train other teachers. A discussion board, mailing list, or other mechanism to provide answers to questions and concerns is critical. It is also important to chart and report the progress of the program. This can help to target any shortcomings or opportunities to constantly improve the program

As teachers, administrators and technology leaders confront the challenge of integrating technology into our schools, the creation of a grass-roots program grounded in the principles of andragogy can meet the challenge. As the community of leadership (Maurer, 1998) works together to support teachers in this worthy endeavor, significant progress has been possible.

Influence of Computer Assisted Teaching on Development of Faculty Staff Members at Atatürk University

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Abstract: With the intention of determining the attitudes of faculty instructors to Computer Assisted Teaching (CAT) in their own major fields of study I attempted to carry out this survey. This study is based on the collected data via a questionnaire applied on 98 staff members currently teaching at Atatürk University, Erzurum, Turkey. The survey intends to determine and analyze various opinions of the staff members about the effects of Computer Assisted Teaching (CAT) on their development.

Collected data from the replied questionnaire items were analyzed using frequency- percent and a report of the study that investigated the affect of Computer Assisted Teaching (CAT) on the development of the staff members at the university.

In conclusion, evidence based on the staff members' opinions was found that Computer Assisted Teaching (CAT) has a significant effect on the development of staff members.

Considering the influence of Computer Assisted Teaching on the development of staff members at Atatürk University, Erzurum-Turkey, a questionnaire containing 15 items, two of which were related to individual's field of study or department where he works and teaching experience at university. Other 13 items were intended to reveal the instructor's view on whether Computer Assisted Teaching affects the development of the instructor or not. Last item was not a multiple choice item. For that item the participant was expected to write his/her additional view on effects of Computer Assisted Teaching on the development of staff members at Atatürk University.

As stated by (Eley 1995, p.22-26) "it has been argued that computer-assisted learning (CAL) offers the possibility of introducing new teaching and learning styles which can expand the horizons of staff and students alike."

All the participants are working at 8 different departments of Faculty of Education at Atatürk University, Erzurum. 98 instructor filled in the questionnaire forms. The participants stated that there is not any Computer Assisted Teaching facility at the faculty, so that they could't deal with Computer Assisted Teaching or Learning issues. This is also supported by Eley's (1995) quotation from McDonough (1992) that:

"there is little evidence of universities having instituted a staff development programme to ensure that there is sufficient expertise to provide the necessary support for the use of computers in teaching and to encourage curriculum development. It is essential that this failure is remedied"

However they are not directly deal with Computer Assisted Teaching they declared their opinions on computer assisted teaching's influence on staff members' development. Mean of total points in the questionnaire results (2,71/3 and 32,61/36 points) indicates that a great majority of the instructors who participated agreed that Computer Assisted Teaching has a significant affect on development of instructors. Following questionnaire items indicates the percentage and frequency result tables. In each item frequency and percentage of each choice were given. Choices for 12 items were YES, NO and PARTLY. Points for the choices were as follows: YES=3 points, NO=1 point and PARTLY= 2 points. Overview of results are shown in Table I:

Item	QUESTIONNAIRE ITEMS	N	FREQUENCY			PERCENTS			Mean
			No	Partly	Yes	No	Partly	Yes	
3	Computer Assisted Teaching has an effect on the instructor's acquiring required qualities during his/her pre-service education	98	4	16	78	4,1	16,3	79,6	2,76
4	There should be Computer Assisted Teaching applications at the higher education institution where the instructor teaches for staff development.	98	2	10	86	2,0	10,2	87,8	2,86
5	Computer Assisted Teaching has an effect on acquiring the skill of determining the objectives of the course the instructor teaches in terms of staff development	98	6	26	66	6,1	26,5	67,3	2,61
6	To apply Computer Assisted Teaching is influential for the instructor on making an effective syllabus of his course.	98	2	36	60	2,0	36,7	61,2	2,59
7	Computer Assisted Teaching affects the instructor's skill of teaching his course within a shorter time.	98	2	30	66	2,0	30,6	67,3	2,65

8	As Computer Assisted Teaching saved the instructor's teaching time, it provides extra time for him to deal with creative issues, such as developing course material or project and so forth.	98	2	10	86	2,0	10,2	87,8	2,86
9	The instructor spending his time to create course content through Computer Assisted Teaching is in a continuous effort to get new knowledge, so that he develops renewing his knowledge.	98	2	20	76	2,0	20,4	77,6	2,76
10	As the students attending a computer assisted course can access to information more rapidly than any other way, the instructor adapts himself to this dynamic demands of the students, so that he develops in this way.	98	2	20	76	2,0	20,4	77,6	2,76
11	As the students attending a computer assisted course can access to information more rapidly than any other way, the instructor adapts himself to this dynamic demands of the students, so that he develops in this way.	98	0	8	90	0	8,2	91,8	2,92
12	Both the instructor and the student develop themselves by discussing vocational/academic topics by being a member of a listserv through the enlightenment of Computer Assisted Teaching.	98	0	30	68	0	30,6	69,4	2,69
13	Computer Assisted Teaching requires the instructor to use available measurement and evaluation techniques. Therefore Computer Assisted Teaching is influential on self development of the instructor	98	2	38	58	2,0	38,8	59,2	2,57
14	As the student of a Computer Assisted Teaching course is more active than those of a proper course, the instructor teaches his course actively and enthusiastically.	98	4	32	62	4,1	32,7	63,2	2,59

Table I. Frequencies of items.

Collected data were analyzed through Frequency and One Way ANOVA Test on SPSS v9.01.
Table II indicates that there is no significant difference among departments/fields of study (P>0,005) based on the instructors' views on the influence of Computer Assisted Teaching on the development of staff members.

PMEAN

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,201	5	4,020E-02	,772	,573
Within Groups	4,794	92	5,211E-02		
Total	4,995	97			

Table II. Variance Analyses of Deparments

Also it is found that there is no significant difference among teaching experince periods of staff members considering the effect of Computer Assisted Teaching on instructors' development. (P>0,005). See Table III.

PMEAN

	Sum Square	df	Mea Squar	F	Sig.
Between	,250	4	6,256E-	1,226	,305
Within	4,745	93	5,102E-		
Total	4,995	97			

Table III. Variance Analyses of Teaching Experience Periods.

Some selected opinions of questionnaire participants for the item 15 requires to be written additionally are worth mentioning.

- Computer Assisted Teaching is influential on developing instructor's skills on selecting and evaluating educational softwares in his field of study.
- Computer Assisted Teaching develops instructor's skill of effectiveness on participating on Educational software developing activities.
- Computer Assisted Teaching influences positively instructor's ordering his information compiled from other sources in presenting during his courses

In conclusion staff members are strongly demanding to take part in Computer Assisted Teaching activities in terms of not only increasing quality of education but also developing teacher training at higer education level. It may be suggested that Computer Assisted Teaching environment at school should be provided according to the recent advanced technological needs for both learners and the teaching staff. Otherwise realization of these invaluable opinions of the instructors cannot go beyond a nice dream.

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Characteristics of Support Initiatives to Stimulate Professional Development on ICT

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Abstract: Educational institutions have to support their staff in their professional development on ICT. The innovation and professional development literature suggest some, be it vague, principles to realise this support. In line with these principles a support strategy has been developed at the University of Leuven. In this contribution, an analysis is made of the different initiatives, in order to detect effective and powerful factors. An analysis scheme was developed. Powerful features of professional development initiatives that may guide decisions on elaborating educational support strategies and professional development initiatives are identified.

Educational institutions have to support their staff in their professional development on ICT. The diversity with respect to knowledge, skills and attitudes on ICT, requires a diversity of initiatives for professional development. Traditional professional development training initiatives are to be completed with a systematic support strategy, pointed to different phases of the professional educational development, covering a variety of ICT-issues and addressing a variety of target groups.

Laga, Elen and Waeytens (1999) argued that only 'integrated' support strategies can be successful. This means that various aspects of ICT-employment (hardware, software, education, symbol systems and management) are covered and their interrelationship is clarified. Because the use of ICT is (and should be) instrumental to the realisation of content specific educational goals, a second aspect of integration is that all discussions about the use of ICT are related to the educational approaches or philosophy of the institution. In addition to the integration requirements, the following principles for a global educational support strategy were identified: 1) the strategy covers all aspects and meets the needs of all ICT-users; 2) specific components of the strategy are targeted to specific users, with different questions and needs. Hence, support components of the strategy differ from one another with respect to the amount, intensity and content of support; and 3) support is intended to be self-destructive and oriented towards enhanced independence of ICT-users.
Although vague, these principles can be useful as general guidelines. Bearing them in mind, numerous and diverse initiatives can be part of a professional support strategy. Not all of these initiatives will be equally effective. However, it remains difficult at this stage to assess the (potential) effectiveness of both general support strategies and specific ICT-related professional development activities. This difficulty is related both to the number of influencing factors and the absence of a clear analysis scheme. In this contribution, such an analysis scheme is presented. In order to show its relevance, the scheme is used to analyse the ICT-related support initiatives and the strategy of the University of Leuven. The strategy was gradually developed by considering the above mentioned principles. An analysis of these initiatives, along with some evaluation results, enables to describe important features of specific initiatives for professional development and of the support strategy as a whole.

Analysis Scheme

The analysis scheme (see Table 1) contains elements presumed to be relevant for professional development in general, and professional development on ICT in particular. This scheme allows for a more analytical description of specific support initiatives. Such descriptions enable targeted evaluations and more encompassing comparisons. The following elements are included:

1) *Purpose*: What purpose do the organisers of this initiative have in mind? Sensitising, informing, training, coaching or a combination? In deciding about the purpose, knowledge, skills and attitudes about ICT of potential participants, have to be considered.

2) *Target group*: Different persons have different responsibilities with respect to the training or the specific course in which ICT could be used. They also have a different task in the realisation and implementation of the ICT-application.
3) *Perspective*: Is the initiative concentrated on an isolated issue (e.g., the use of e-mail), a specific viewpoint on the use of ICT in education (e.g., the educational viewpoint), or does it cover various aspects and viewpoints of ICT-employment (e.g., technology, organisation, ...)?
4) *Initiator*: Is the initiative the result of a request from the users (re-active) or has some other organisational body decided (pro-active) that users might benefit from the activity?
5) *Accessibility*: Can the target group get access to the support when they need?
6) *Control*: Who controls the programme and content of the support initiative: the users or the organisers?
7) *Commitment of the participants*: Does one expect active participation from the participants?
8) *Connection to the specific educational context of the participants*: Is the specific educational context of the participants taken into account during the support initiative?
9) *Number of participants*: Is the initiative directed towards individuals or groups?
10) *Instructional methods:* What instructional methods are used by the organisers?
11) *Use of ICT*: Do participants use ICT during the initiative?

Purpose	Sensitising
	Informing
	Training
	Coaching
Target group	Teaching staff
	Assistants
	Decision-makers
	Support staff
Perspective	Isolated issue (different perspectives)
	Educational view
	Technological view
	Managerial view
Initiator of the initiative	Pro-active
	Re-active
Accessibility of the support	Just-in-time
	Fixed
Control by the learner	Non
	Little
	A lot
	Complete

Commitment requested by the participants	Yes
	No
Connection to the specific educational context	No
	Small
	Strong
	Very strong
Number of participants	Collective
	Individual
Instructional methods	Lectures
	Demonstrations
	Discussions
	Collaborative work
	Project-work
	Assignments
	Tutoring
	Hands-on
Use of ICT by participants	Yes
	No

Table 1: Analysis scheme

Analysis of the Support Initiatives of the University of Leuven

The University of Leuven has gradually developed a diverse set of activities to support educational innovation and the use of ICT. Attempts were made to consolidate these activities (see Table 2) and elaborate an integrated ICT support strategy. By using the described analysis scheme, an analysis of these initiatives is made.

1) *Yearly conference about educational innovation*. The purpose of this conference is to sensitise staff and decision-makers for educational innovation. Innovation is emphasised, the use of ICT is only been viewed from an educational point. The conference is a fixed annually pro-active initiative. The target group has no control over programme or content, no active participation from the participants is required and there is no direct relation to their specific educational context. In addition to some lectures, staff may participate in discussions about specific subjects and can take a look at some ICT-applications realised by colleagues.
2) *Professional educational training for new teaching staff*. New staff is introduced in the educational philosophy of the institution. They get the opportunity to learn about and reflect upon different aspects of learning environments and their interrelationship. Participants are informed about the potential role of ICT in education in one session. The perspective is only educational. Participants get assignments in order to clarify the relation with their educational context. The extent to which ICT is discussed depends on the participants. They may ask for individual targeted support. This individual support complements the collective training where participants have no control over the programme and content. ICT is used as a means to spread information and assignments.
3) *Workshop for new teaching assistants*. New assistants are invited for a seminar on their educational task. During this seminar they can participate in a collective workshop about the educational use of ICT. The use of ICT is discussed from different points of view, but the educational viewpoint is emphasised. This pro-active workshop is fixed in time. Participants have no control over the programme. Active participation is

required. The precise content depends to some extent on their questions. The relatedness to the specific educational contexts of the participants is rather vague. The workshop contains exercises and discussions. Participants do not use ICT.

4) *Informative sessions.* Teaching staff and assistants are invited for informative sessions about isolated educational or technological issues on using ICT in education (e.g., 'influence of symbol systems on the learning of students', 'videoconferencing', 'teamwork through the net'). These pro-active sessions are fixed in time and have a fixed programme and content. No active participation is required and there is no direct relation with the specific educational contexts of the participants. During these collective sessions there is place for lecturing and discussion. Sometimes videoconferencing is used, in order to enable participation by staff members at a distant location.
5) *Training sessions.* These sessions are open to all staff members and emphasise an isolated issue of ICT (e.g., the evaluation (what, how and when) of ICT-applications and their use in an educational context). The training is collective, pro-active and fixed in time. Participants have no control over programme and content. During the training session active participation is requested. Lectures, assignments, teamwork and discussions are combined during the training sessions. There is a small relatedness to the specific educational context of the participants during assignments. Participants do not use ICT.
6) *Demonstrations.* Staff, assistants and students are invited for demonstrations of ICT-applications developed by colleagues. Participants are informed about different components of ICT: the development, the role in the learning environment, the structure of the application, the use of the application by the students, technological requirements and problems, software used, evaluation methods and results, etc. The demonstrations are fixed in time, collective and pro-active (although in the future they may be re-active). Participants have no control over programme or content, and no active participation is required. The educational context of participants is not taken into account. During demonstrations lecturing, demonstration and discussion are combined. Until three months after the demonstration, participants can explore the ICT-application and the informative given during the demonstration itself in a dedicated demonstration room. During this re-active and individual support, they use the involved ICT-application.
7) *Intensive training about the use of ICT in education.* Teaching staff and their assistants are intensively trained and coached in using ICT in their education. The training covers different aspects of ICT-employment from different perspectives. The training of 10 days is fixed in time and pro-active. The participants have some control over programme and content. Organisers are flexible enough to go along with questions and interest of the participants. The training is immediately related to the specific educational context of the participants. Being actually involved in a project on the use of ICT in education is an entry requirement. A project means that the participants have a plan to use ICT in their course. The training exists of lectures, assignments for each project team, collective assignments, workshops for hands-on experience, discussions between project teams, demonstrations and project work. Each project team can work with personalised technological and educational coaching on the design and development of the ICT-application of their project. ICT use by the participants is limited.
8) *Training about the use of ICT in education.* During this training teaching assistants are informed and trained in the use of ICT in education. The training covers all viewpoints of ICT-employment. It aims at exchanging experiences and preventing assistants to loose time in finding and trying out a lot of things while designing and developing an application. The training is pro-active and fixed in time (but spread over 8 months). Participants have some control over programme and content. The training is only partly fixed and organisers are flexible to go along with questions and interests of the participants. The relation with the specific context is high. To be actively involved in an educational ICT-related project is an entry requirement. Assistants must be responsible for the design and development of a specific ICT-application for a specific educational setting or course. During collective sessions, lectures, demonstrations, assignments and discussion are used. Between two sessions of the training, the participants get an assignment, directly related to their own project. ICT is used to offer informative materials, and to discuss related topics. Upon request of the participants, they may get individual coaching for completing the assignments or for their own project-related design, development, implementation and/or evaluation activities.
9) *Support path for beginning ICT-users.* Staff members who plan to use ICT in their course can be coached. This implies that they get five assignments on the design, development, implementation and evaluation of a specific ICT-application. The initiative is pro-active as well as re-active. Each assignment is at least one time discussed with an educational expert. On request more guidance regarding this and/or other aspects of the use of ICT can be provided. Participants control the content, the programme and the timing of the initiative. The initiative is partly fixed in time, partly just-in-time. ICT is used to distribute information.
10) *Individual support.* Teaching staff and assistants can raise specific questions about all design, development, implementation and evaluation activities and with respect to any aspect of ICT-employment. Answers to these questions are formulated or coaching with respect to these activities is given by educational, technological and/or media experts. This re-active support is just-in-time and the content is in full control of the participants. The support is directly related to the specific educational context of the participants.

There is no use of ICT to deliver the support. If different people have the same questions (e.g., about a specific software tool), those people are brought together. If appropriate, an informative session or training can be organised.

11) *Helpdesk.* All decision-makers, staff members and assistants can send questions about using ICT in education via e-mail to a helpdesk. Questions may be informative about a topic (e.g., examples of specific ICT-applications or tools), and be related to any aspect of ICT-employment. The helpdesk answers the question, informs where to find more information, refers to experts on the topic or to specific examples, etc. This initiative is re-active, just-in-time and individual. The relatedness of this content to the specific educational setting depends on the question.

Table 2 gives an overview of this analysis. There are no specific professional development activities for members of the support staff. This alternative of the element 'target group' is therefore left out this overview.

Observations of Particular Initiatives

Some of the described and analysed support initiatives are in their conceptual phase. Below are the most important observations, experienced problems and evaluation results of and with the other initiatives.

- Questions on ICT in education of staff members mainly address technological and/or organisational issues. These questions reflect a naïve view on the use of ICT in education. One of the consequences is that ICT is mostly added to and not integrated in the learning environment.
- This observation calls for caution with initiatives to sensitising staff. Any solely technological initiative would strengthen such a view. Therefore, sensitising initiatives should always be related to the realisation of student-centred learning environments.
- Informative sessions do not resolve questions about the contextualisation of the information presented. Regularly, participants feel left behind with questions about the meaning of the information for their own settings and what steps they have to take to transfer the informative into their courses.
- Effects of professional development activities on ICT become larger, when the relationship with the specific course or content is more direct and more active participation from the participants is required.
- Some of the participants of the intensive training on ICT testified that training leads to a radical change in their educational behaviour. Remarkable is the observation from the evaluation results, that mainly teaching staff had the feeling to have learned something, while assistants do not report large learning gains. Staff members may be more involved in the teaching task and have more questions about it. This corresponds to the opinion of Korthagen and Kessels (1999), that a learner must have personal concerns about teaching or must have encountered concrete problems in order to benefit from professional development activities.
- After only three sessions of the training for assistants, two of the seven projects asked for individual support with respect to specific educational and/or technological aspects. Four out of 15 projects that participated in the intensive training returned within a year for individual coaching with respect to educational or technological aspects. Training and coaching, fixed in a short time, seems not to be sufficient for those who are really working on an ICT-application.
- A good balance between pro- and re-active initiatives seems to work. Teaching staff and assistants mostly do not know what knowledge and skills they need for effectively using ICT in their courses. So pro-active initiatives are necessary. Otherwise it is not always possible to handle specific and concrete questions of individual staff in these (mostly) collective initiatives.
- The majority of people that asked individual support, were people who previously participated in some training. There are at least three possible explanations for this: 1) these people are aware that for an effective use of ICT in their education, there is a need for expertise they do not have, while others are unaware of this and do not experience problems with it; 2) they know that they can ask for individual support, others do not know this; or 3) other people have the knowledge and skills needed, hence, they do not need any training and/or individual support.
- During individual support it is not always easy to detect what one wants to realise, probably because staff members and assistants do not have an elaborated terminology to discuss educational issues. Another factor is that this 'counselling' requires specific skills of the support-giving experts.
- Participants of the intensive training who returned for individual support seemed not always to have changed their subjective educational theories. But in comparison of staff members and assistants who did not participate in any training on ICT, they can clarify what they want to realise and understand more easily questions and suggestions from the experts.

	Sensitising	Informing	Training	Coaching	Teaching staff	Assistants	Decision-makers	Isolated issue	Educational viewpoint	Technological viewpoint	Managerial viewpoint	Pro-active	Re-active	Fixed	Just-in-time	Control by the learner	Commitment requested	Relatedness to specific context	Individual	Collective	Lectures	Demonstrations	Discussions	Collaborative work	Project-work	Assignments	Tutoring	Hands-on	Use of ICT
Conference on innovation	X				X		X		X			X		X		/		/		X	X	X	X						
Training for new staff		X			X				X			X		X		*	X	*	(x)	X	X		X	X		X			X
Workshop on ICT		X	X			X			X	X	X	X		X		*	X	*		X			X	X		X			
Informative sessions		X			X	X		X				X		X		/		/		X	X		X						
Training days on ICT			X		X			X	X			X		X		/	X	*		X	X		X	X		X			
Demonstrations		X			X	X			X	X	X	X	(x)	X		/		/	(x)	X	X	X	X						(x)
Intensive training on ICT			X	X	X	X			X	X	X	X		X		**	X	***	X	X	X	X	X	X	X	X		X	(x)
Training on ICT		X	X	(x)		X			X	X	X	X		X	(x)	*(***)	X	***	(x)	X	X	X	X	X		X			X
Support path				X	X	X			X	X	X		X	X	(x)	**	X	***	X								X		
Individual support		X		X	X	X		X					X		X	***	X	***	X								X		
Helpdesk		X			X	X	X	X	X	X	X		X		X	**		**	X	(x)									X

Table 2: Overview of the analysis of the initiatives, part of the global support strategy for professional development on ICT of the University of Leuven. (X = valid; ( ) = valid, but not standard; / = non; * = little or small; ** = a lot or strong; *** = complete or very strong)

- Some of the participants could not combine the intensive training with their daily work and perceived the training as too time-consuming. Others found it worthwhile that they had to free time for training.
- Based on the spontaneous reactions on the evaluation forms of the intensive training, one may conclude that most participants found it very useful to participate in the training in project groups. The discussions between staff members and their assistants seemed to have been very instructive. The same observations can be made for the training of assistants. One assistant who asked individual support came alone the first time. The second time he returned with the responsible staff member.
- People like to see examples of effective ICT-applications, and are very interested in the (positive ánd negative) experiences of colleagues with the design, development, implementation and evaluation of an ICT-application. This is in harmony with one of the findings from a study of the American Productivity & Quality Centre (APQC) on best practices in faculty instructional development on the use of technology in teaching (Bates, 1999). Faculty members seemed to learn best from peers through show-and-tell demonstrations by colleagues who developed good examples of technology-based teaching.
- Because the use of ICT in education, with all his aspects, is a rather new domain, only few people have (all) the required knowledge. If one wants to organise informative and training initiatives, one needs to appeal to others. Given the lack of widely spread experience, it is not easy to find persons who 1) want to contribute, 2) have the knowledge about the use of ICT in education, and 3) have the skills to develop activities that respond to the purpose of the initiative. Especially for the training activities, the creation of a rich learning environment is not a simple task. A good collaboration and coordination in a multidisciplinary team is therefore essential.

Conclusion: Powerful Features of Professional Development Initiatives

Although there is (at this moment) no empirical evidence about the effectiveness of the different initiatives and the global support strategy, one can identify some powerful features of professional development initiatives. These features may guide decisions while both elaborating an educational support strategy and designing specific professional development initiatives:

- In order to promote transfer the relationship between the educational context and the training elements must be as high as possible. Transfer is also facilitated when participants are active, have specific problems and/or questions.
- Staff members who have no concrete problems and/or questions should be reached by sensitising initiatives, but always in a context of educational innovation or the realisation of student-centred learning environments. Participants with concrete plans to use ICT should be given the opportunity to actively elaborate their plans from different perspectives. These plans are to be continuously challenged.
- One can only require active participation if the relevance of the initiative for their educational context is clear.
- Collaboration between staff members and their assistants benefits to all and should therefore be stimulated.
- Staff members who share their questions and experiences with respect to the design, development, implementation and evaluation of an ICT-application enrich the professional development on ICT of colleagues.
- Professional development on ICT requires time. It is necessary that participants get and make time.
- A good balance between pro- and re-active initiatives is beneficial.
- People need a place where individual questions are answered or individual support is provided just-in-time and upon request. If one wants during training that participants learn to detect the expertise they need for effectively using ICT in education, one also has to make this expertise available. Staff members cannot become experts on the use of ICT in education. They only can obtain more expertise about it.
- Re-active individual support or pro-active coaching initiatives should be flexible enough to deal with any type of questions about ICT-employment.

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Out of SITE and into Staff Development

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Abstract: This paper outlines a framework for transforming technology integration within a public school system from isolated success stories to a district-wide movement. This is accomplished in two phases: 1) A district staff development day based on the SITE conference model is used to expose educators to available resources and possibilities for curriculum and technology integration. 2) This day is followed by a yearlong focus on professional development and curriculum support utilizing online, interactive tools. Central to the entire process is encouraging educators to become leaders in their own development by taking advantage of online resources that encourage mentoring and collaboration.

Finding our Catalyst

Solutions can be few and far between in the field of Instructional Technology; however, it is the recurring themes that can be illuminating. After attending SITE for two years, one of these themes seemed to continually catch our attention. It appeared that many districts that had widespread success with technology integration had a catalyst of some sort, something that took integration from the level of dispersed, isolated successes to district-wide acceptance and participation.

Over the last three years, our office has experienced the more isolated successes with curriculum/technology integration. While this can be exciting, it is mostly one-on-one work that is resource intensive and does little to further district-wide progress. We began to look for our catalyst. We wanted something that would raise the district's technology energy past the activation level required to begin the desired chain reaction of integration throughout the district.

We decided our catalyst would be found in a staff development solution, and the SITE conference model would be an excellent method for delivery. Our commitment would be a year of unprecedented district-wide professional development beginning with a day devoted to curriculum/technology integration. Our proposal to utilize one of two district-wide staff development days was based on the following premise:

1. Staff Development is an important issue that is difficult to effectively address in a district as large and diverse as Framingham, MA (15 schools and 51 languages spoken in homes).
2. Curriculum/Technology Integration in Framingham has progressed slowly over the last two years, and it will continue at the current rate unless new methods of leveraging resources are implemented.
3. It is well documented that Professional Development is one of the vital components to effective Curriculum/Technology integration.

We believed that by pooling the resources of the Office of Technology with those of the Office of Curriculum and Staff Development we could develop a conference-style day based on the free-flowing model of the SITE conference with multiple concurrent presentations, discussion groups, and open rooms for some hands-on experimentation with technology resources.

This staff development day (to be held on October 20, 2000) would have four important components:

1. The presentations and discussions would be *by* teachers and *for* teachers. Seventy of our approximately 85 presenters would be Framingham teachers sharing their curriculum/technology integration experiences with 975 staff members.
2. Presentations would be rooted in resources available to teachers throughout the district. The Office of Technology guarantees a "toolbox" of resources for every teacher (e.g., Internet, Inspiration, MSOffice/AppleWorks, Timeliner, Hyperstudio, etc.) This means that staff members could immediately utilize the ideas they acquired from the presentations.
3. The SITE model would allow staff members to tailor the day to meet their individual needs. The intent would be to maximize their exposure to and enthusiasm for curriculum/technology integration.
4. The day would be a kick-off to a yearlong commitment to staff development as it relates to curriculum/technology integration. The day would not be expected to stand-alone. The follow-up instructional support with staff and the encouraging of collaboration would be vital to sustaining our desired "chain reaction."

Preparations

The details of arranging the professional development day took approximately 4 months to organize. This was the first time that Framingham would bring all of its educators into one location for one subject on a professional development day. Meetings with the Office of Staff Development were useful in arranging logistics of the day due to their experience with previous professional development days.

Presenters were mostly educators from Framingham, as we have mentioned. All presenters were required to use PowerPoint or Apple Works slide shows. No overheads were allowed. Meetings with these presenters were scheduled in order to convey the theme of the day, and to lend assistance in developing presentations. Presenters were provided with templates for slide shows. These templates included questions for the presenters that focused on the theme of the day. Many teachers found these to be quite helpful. These district presenters received $50 per presentation.

A select few presenters from outside of the Framingham Public Schools were invited. These included representatives from Public Broadcasting System (PBS), Apple Computers, Classroom Connect, CyberArts International, and representatives from institutions offering Masters programs in Instructional Technology. One stipulation placed on these presenters was that they focus on resources available to teachers for their classrooms or their own professional development. We were not looking for vendors who would show teachers products they could not afford.

The day was billed as *Curriculum and Technology Integration: a Day for Framingham Educators.* Every educator received a 6-page program (including a description of each presentation) 3 days prior to the event. This allowed attendees to choose presentations that interested them, as well as choose second and third options in case rooms were full. There was no pre-registration for sessions. Initially, presentations followed a SITE model with ½-hour presentations and some 1-hour discussions. Concern regarding logistics of the day caused us to change all sessions to 45 minutes. Three sessions were offered in the morning and 3 in the afternoon with an average of 22 presentations per session. Rooms dubbed "Follow-up Rooms" were added to

allow attendees to extended discussions initiated by presentations. Attendees also had the option of visiting "Toolbox Rooms." These were lab setting in which teachers could spend some "play-time" learning about district-wide software and Internet resources.

Results of the Day

The professional development day was very successful. Key to the success of the day was the considerable support available to participants and attendees. The entire technology staff and members of the Office of Staff Development were available for technical and logistical support. Approximately 20 high school students also provided technical assistance and helped to move attendees from the auditorium to the presentation areas and back.

Results from a questionnaire enclosed in the programs suggest that attendees found the SITE conference model refreshing compared to the more traditional professional development day model in which teachers have little or no choice regarding the day's topics. A total of 181 responses were collected. All questions were measured on a 5-point Lickert scale with *a lower score being more favorable.* The most favorable responses were to questions regarding the multiple presentation format (mean=1.68) and regarding the realistic connection of presentations to using technology in the classroom (1.77). The least favorable response involved finding adequate choices for specific grade levels (2.34); however, this mean response is still quite favorable.

Other feedback, conversationally and in the form of e-mail, has been most encouraging. One attendee commented, "It was very well done...very professional and energizing...the other thing that made it so great was that everything that was demonstrated, was *so do-able.*" Another comment from a presenter also hit the mark, "As I was leaving, a teacher stopped her car, got out, and said, 'I just had to tell you thank you - your presentation has given me the courage to try this in my own classroom.' This quote alone made the effort that went into my presentation worthwhile and speaks to the power of peers teaching peers."

We are currently collecting information on the impact of this day, but changes have already been noticed. There has been an increase in requests for assistance using technology in the classroom, especially in using *Inspiration, WebQuests, Journey North*, and other Internet based resources. We have also had more than 40 staff members sign up to use a new online collaboration tool (*Taskstream*) for developing lesson plans.

Free! to Learn

The staff development day appeared to be challenging enough, but to meet the anticipated flood of interest with yearlong instructional support and only two fulltime Instructional Technology Specialists seemed a task of heroic proportions. It was obvious that we needed to find additional resources that could be leveraged. It was important to find someone that shared our vision and could help maintain the momentum established at the staff development day. *School Change Network* and their "*Free! To Learn*" concept fit the bill.

Free! to Learn was originally developed by *School Change Network* as a newsletter and interactive "manifesto" designed to spread the idea that in today's networked world, educators ought to have the capacity to take charge of their own professional development. Soon after the inception of the *Free! to Learn* newsletter, *School Change Network* expanded the scope of the project to provide a suite of services that would help schools and districts shift to a new professional development paradigm – one in which teachers become the leaders of their own professional growth through collaboration, collegiality, and taking advantage of learning opportunities online.

The *Free! to Learn* approach to professional development dovetailed perfectly with our SITE-modeled staff development concept. In addition, *School Change Network* could bring the expertise and tools we needed to meet the curriculum/technology integration needs of our staff members. One of the most exciting directions our partnership will be taking is the use of an online, interactive curriculum development tool that encourages professional learning and collaboration through online peer mentoring. Our intention is that this tool, and some additional training, will result in a self-sustaining district-wide network of educators who can more effectively collaborate and take control of their own development.

Mentoring and collaboration are popular topics, and with the wide range of technology skills among

educators, they are topics that can have an impact on teacher learning. We also feel that by using this online tool, we are approaching educators at a local level, instead of sending them to a third party, such as an online course. This tool facilitates professional collaboration within our own district, where teachers are in a comfortable environment with colleagues they know, and not with relatively unfamiliar "outside experts."

Where Do We Go from Here?

School Change Network will also assist in collecting and analyzing data to measure our progress as a district. We recognize that if this is to have a lasting impact on the Framingham Public Schools, it is necessary to show evidence of our success. We believe that data regarding the effect our approach will have on teachers can be readily collected. One area we will monitor is the development of lesson plans using the online mentoring tool. The lesson plans created with this tool will provide technology-integrated products that are connected to state frameworks, and can be used in classrooms. The biggest challenge will be quantifying changes in student learning as a result of our work with teachers.

We also need to be able to quantify progress in the dissemination of technology integration over the next year. As stated previously, this project was initiated by the desire to move from small occurrences of curriculum/technology integration and towards an expanding sphere of interest and activity.

It is our belief that this process will result in a framework that can be replicated for other districts to generate their own chain reaction, and that a presentation at SITE2001 of the project underway will help us to disseminate the framework. It is also our intention to submit a proposal to present our one-year results at SITE2002.

IMPLEMENTATIONS OF VIDEOCONFERENCING IN IN-SERVICE TEACHER TRAINING

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Abstract: This paper presents the possibilities of VC in staff development and experiences that the Ziridis School has had when teachers took part in interactive lessons instructed via ISDN-videoconference. The results of the experiences are explained and some suggestions for the use of ISDN-videoconferencing are made for in-service training and staff development. The paper is presented with videotaped-material of distance lessons and interviews of staff in Greece and remote teachers in Finland.

1. The Ziridis Schools

The Ziridis Schools is a private leading educational organization in Athens with a 67 years tradition. Today it has nearly 2000 students in Kindergarten, Elementary, Junior High School and Senior High School and a staff of 350.

The mission statement of the Ziridis Schools is: "In the most modern educational environment we create the citizens of the world. The leaders of tomorrow." Through experimentation and discovery the school promotes the special talents of each child.

The educational philosophy of the school is based on multiple intelligences, cooperative learning, teamteaching and interdisciplinary approaches. A special emphasis is given to ICT and various internet- and email-projects are implemented with schools in Greece, Europe and other countries of the world. The school has four modern computer laboratories, computers in classrooms and own production of CD-ROMs. The school is the first one in Greece using ISDN-videoconference as a tool for teaching and learning.

There is a special Center of Research and Development which works on the implementation innovations and teaching practices. It is divided into three departments: Information and Communication Technology, Teacher Training and New Programs, and Student Care [www.ziridis.gr].

2. In-service training

In order to reach the goals and fulfill the mission the staff must be aware of possibilities of ICT in education. As part of our in-service further education and staff development we have used ISDN-based videoconferencing. The educators have received instruction from the Department of Educational Sciences and Teacher Training of the University of Oulu where there exists a lot of experience of distance learning environments (wwwedu.oulu.fi). The lessons have been delivered using ISDN-videoconference technology from Finland and so the trainees have had authentic experiences as learners. Main focus has been placed on to classroom-based instruction.

<u>Interaction.</u> During the lessons the interaction between the teacher and the distance class is analyzed. The personality and teaching skills of teacher plays a significant role. He must be also familiar with communication using media. He must be like a director of a theatrical play who takes care of visual outlook. He must be a bit of a technician in order to handle the vc-equipment and supportive equipment (like document camera). The critical point is his professionalism and careful lesson planning.

But not only is the interaction between the teacher and the students important, but also the interaction between students is very important. The social atmosphere is a little different from a "normal" classroom situation. There might be even lessons that the remote classroom doesn't have a teacher at all and the pupils take care of technology and discipline. This needs a little training for pupils and a good team-spirit. A suitable group is considered as 8 to 12 students.

Physical environment. During training period is analyzed also the physical environment of distance lesson. Apart from appropriate videoconferencing equipment there also must be a suitable classroom for distance learning. Garish colors must not be used, the lights must be well-directed, proper furniture, sufficient and adequate appendix material for teaching etc. The placement of microphones, loudspeakers, screen or projector and camera are extremely essential, because sound and picture are the most important elements in the successful completion of the learning objectives.

Experiences. Videoconferencing has given challenges to create the contents of in-service training exactly according to the needs of the staff. The technology has facilitated the use of experts from a well-known foreign university which has a long history in videoconferencing and generally in the use of ICT in education. The staff of the Ziridis School has been trained by several professionals without them loosing their valuable time for travelling. And so the costs also have naturally been much lower.

When the teachers have themselves been as "pupils" in videoconference lesson, they understand the learning situation much better, the communication, the interaction, and the limitations with voice and picture. Many small details during a lesson, unintentional noises like cough, the tapping of a pencil, noises of a squeaky chair etc. They have also noticed how important it is to change the picture between two cameras (if it exists), rhythm of lesson like speaking, pausing, asking questions, showing transparencies, giving time to think or answer and so on. Also basic things like

- listening to one another,
- the way of making questions understandable,
- having eye-contact with pupils,
- is the teacher communicating for an individual or a group
- how does a teacher make his instruction interesting

All these points become more emphasized in videoconference lesson than in normal face-to-face situation. But it gives many possibilities for students to practice their skills of cooperative learning and team work, they must be more active and responsible in their own learning and they learn to be more self-disciplined.

3. Suggestions

Very good training for every teacher is to change opinions and to discuss about learning processes with other teachers in other teaching environments. It's advisable to organize special training for different categories of teachers, i.e. elementary school teachers and high school teachers in different groups. It is also very practical to divide teachers in groups according to their areas of specialization, because every teaching subject is different: language teaching differs a great deal from a physics laboratory and so the teaching methods also in VC-environment are different.

The experiences of the teachers of the Ziridis Schools in the use of videoconferencing as the way of in-service training have been very positive. The idea is to create a network of schools and universities in Greece and all over the world that are cooperating through VC. Also technology gives a number of possibilities for extended education of administrational staff. Therefore the persons of management and secretarial staff are able to share the experiences and learn from each other.

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Smart Classrooms Led by Technology Using Teacher Educators

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Abstract. The College of Education at a western upper division state university has two computer classrooms, called Smart Classrooms, that mirror the configuration found in many local schools where teachers have a limited number of computers. This paper presents the results of a qualitative study in which the authors explored the pedagogical beliefs of five teacher educators who used technology in their teaching. The researchers wished to know their reasons for booking the classroom and their cultural preferences in designing instructional activities. The data consisted of interview transcriptions and responses to written follow up questions. Data analysis indicated that the faculty chose to use a Smart Classroom because it matched their teaching methods. They developed a variety of meaningful technology uses for their students and addressed many elements of multicultural integration. The authors discuss implications for faculty development and raise questions for further study.

Introduction

Teacher education faculty serve as role models for their students; their uses of technology and attitudes towards it directly impact student teachers' implementation of educational technology (Huang, 1994). Equally, they serve as models for teaching in culturally supportive ways. Their attitudes towards and assumptions about diversity manifest themselves in how they use technology to support learning differences, diverse needs and cultural preferences for learning. Unfortunately, many professors do not use technology in their teaching (Parker, 1997) and, therefore, do not effectively model technology use for preservice teachers (Moursund & Bielefeldt, 1999). At the same time, many teacher educators do not intentionally use technology in ways that are supportive of cultural diversity. It is not surprising then that most recent teacher education graduates do not feel prepared to integrate technology in their curriculum (U.S. OTA, 1995) nor in culturally diverse classrooms.

Faculty Modeling

In order to increase the number of teacher educators who model multicultural technology integration, we must first identify those factors which may increase the likelihood of faculty modeling of multicultural technology integration. We speculate that faculty members' world views and teaching approaches may influence their selection and management of technology applications in the classroom. In an exploratory study of 157 technology-using teacher educators, Robin and Harris (1998) found that those surveyed showed a tendency toward learner-centered teaching. Those who preferred learner-centered teaching approaches were more social and indicated a preference for highly participative educational activities.

Similarly, cultural preferences and beliefs play an important part in how technology-using educators organize classroom learning activities. Chisholm (1998) identified six culturally supportive teaching elements for technology integration: cultural awareness, cultural relevance, culturally supportive environment, equitable access, instructional flexibility and instructional integration. A case study by Stafford-Levy and Wiburg (2000)

found that the six elements fit a constructivist instructional approach and foster minority students' learning by creating a culturally supportive, challenging environment.

Facilitating Transfer of Learning

Not only must there be thoughtful planning of faculty instruction for multicultural technology integration, but the physical layout of classrooms also needs careful planning. Transfer of learning is facilitated when the environment in which material is learned is similar to the environment in which the learner will later be expected to demonstrate the learning (Woolfolk, 1995). Preservice teachers should learn about the integration of technology in university classrooms that mimic the K-12 classrooms in which they will teach. Those classrooms typically do not have one computer per student, but rather to four computers that students share. We might assume that institutions preparing new teachers would hold classes in facilities that mirrored the typical placement of computers in K-12 schools. However, in a recent study of four colleges of education considered exemplary for their integration of technology in teaching, Struder & Wetzel (1999) found that they did not have teaching facilities that mirrored the placement of computers in many K-12 classrooms.

By the same token, preservice teachers should learn about multicultural integration of technology through participation in learning activities that model effective instructional practices. The successful integration of technology in culturally diverse settings requires implementation of appropriate multicultural teaching practices, as well as relevant, productive applications of technology. However many teacher education faculty are unsure of how to integrate multicultural elements into their courses or see it as something more to add to an already full curriculum. Consequently, preservice teachers may not link how faculty model technology use or instructional practices to their application in multicultural settings.

The Study

Purpose

The purpose of this study was to explore the pedagogical beliefs of five teacher educators who use technology in their teaching. These faculty members were early users of one of two computer classrooms, called Smart Classrooms, that in fact mirror the configuration found in many local schools The researchers wished to know their reasons for booking the classroom and their cultural preferences in designing instructional activities. Teaching approaches that involve cooperative learning, students' learning styles, and individual cultural preferences may influence faculty selection and use of technology. Thus the researchers sought to understand the possible link between the faculty's teaching philosophies and instructional activities with their use of technology in teaching.

Methodology

The researchers created a set of questions to guide interviews with these five subjects. The data consist of interview transcriptions and responses to written follow up questions. The five interviewed were the only teacher education instructors, aside from those teaching educational technology, who used the Smart Classrooms. The interview protocol included questions such as: a) What is your teaching philosophy? B) In what ways is your course student-centered? c) do you address the teaching of diverse populations? If so, how? and d) Describe some of the instructional activities you have conducted in this room.

Setting and Sample

The College of Education at a western upper division state university has established two computer Smart Classrooms that in fact mirror the configuration found in many local schools where teachers have a limited number of computers in their classrooms. The Smart Classrooms have eight networked computer

student stations and a central area for 25-30 students made up of seating at 24 movable tables. Each student workstation contains one recent model computer and two monitors allowing 3-5 students to work together.

The five faculty interviewed were the only users of these classrooms from the College of Education. They were all female and represented the following programs Bilingual Education, Educational Administration, Elementary Education, Secondary Education and Special Education. One is Full Professor, three are Associate Professors and one is an Assistant Professor. Their experience in higher education ranged from 31 to 5 years with a mean of 14 years.

Data Analysis

Using the constant comparative method (Strauss, 1987), data analysis began as data were first collected and continued throughout the study. Each researcher independently read the transcripts and identified patterns and questions. Subsequently, they met to discuss patterns they observed in the data and questions that arose after the readings. Together they created follow-up questions and emailed them to the subjects. After collecting this data, the researchers re-read all transcripts and re-categorized the data. The themes that emerged were: beliefs, learning activities and technology fit, management of technology, student-centered approaches, learning activities, assesment of teaching, and multicultural teaching. One researcher used the interview data and follow-up questions to create mini-cases which each professor read and indicated that it represented them accurately. Member checking was also employed as a draft of the full study was sent to the informants to check for accuracy of data and feedback on our analysis. None of the findings were disputed or questioned.

Findings

The researchers found that the faculty chose to use a Smart Classroom because it matched their teaching methods. They valued collaborative student work groups and the eight computer stations made it easy to arrange projects for their students. Although the faculty studied were not formally aware of the six elements of multicultural technology integration, our analysis showed that the faculty designed some activities and made some choices that were resonant with them. Though four of the five faculty thought they were not technology experts, their expertise was sufficient to give them the confidence to try a new teaching environment. Four of the five faculty booking this classroom had designed their own web pages and although their web pages varied in content and complexity, they often included two or more of the following: course syllabi, listserves, on-line journals, and Internet sites related to course content and classroom activities. Similarly, a critical mass of the students had sufficient levels of technology skills to allow the group work to focus on meaningful course outcomes, not just technology skills. Three of the five faculty members assigned a student computer expert to each group. This structure encouraged learning from peers.

An analysis of the interview transcripts revealed no mention of the issue of technology support by central campus computing. This is important because adequate technology support is a key to inducing faculty to use technology in the classroom (Strudler & Wetzel, 1999). Classroom technology support appears not to be an issue for the faculty studied.

The faculty interviewed had developed a variety of meaningful technology uses for their students. These faculty knew what to do and had the technology expertise to make it happen. In their teaching, they addressed many aspects of the six elements of multicultural integration.

Implications and Questions

The findings from this study have implications for faculty development. Faculty will model multicultural technology integration when they see a direct link to their course content, teaching goals, and instructional style. Hence, faculty development activities should provide examples of technology use in specific courses and offer support in faculty planning to integrate technology. Further, teacher educators may frequently apply multiculturally appropriate strategies to technology integration, but not necessarily with an intent to model multicultural integration. Awareness of the multicultural elements and their relationship to their own teaching may expand their repertoire of culturally supportive strategies.

The current study raises the following questions for further study: Why don't other teacher education faculty don't choose to use the Smart Classrooms? Do faculty chose not to use the Smart Classrooms because their teaching methods may not match the Smart Classroom design? Do faculty not feel sufficiently confident in their technology skills? Do faculty not have a vision of meaningful and compelling use of technology in their areas? If the obstacle is technology expertise, what level of technology expertise will faculty need to feel comfortable using technology in teaching? If the obstacle is vision, what uses of technology are compelling for faculty in their specific content areas? What experiences will help them develop personally compelling uses of technology in teaching? Perhaps more difficult is the issue of developing culturally appropriate uses of technology in teaching. How do we model the six multicultural technology integration elements in faculty training?

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From Programs to Pedagogy: Facilitating Professorial Change Through Technological Collaboration

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Abstract: The goal of the "Preparing Tomorrow's Teacher to Use Technology" grant awarded to the University of Houston College of education is to encourage the integration of technology into courses taught by education professors. This modeling of an appropriate use of technology by the university professors is intended to help pre-service teachers acquire proficiency in the use of technology for curricular purposes. To accomplish this goal, many changes had to be implemented, the most challenging of which was to assist professors to move toward pedagogical change through the fusing of technological resources and activities with their curricular objectives. Using an action research model, a collaborative community was developed between professors and the grant project members. The resulting increased interest and excitement of the professors was reflected in their communication with colleagues, their use of electronic communication with their students, and their growing integration of technology into their curriculum.

Introduction

The ultimate goal of a recent "Preparing Tomorrow's Teachers to Use Technology" grant awarded to the University of Houston College of Education is to encourage the use of appropriate technology in the future K-12 population taught by our graduates. Appropriate use of technology is associated with a student's active participation in the learning process and increased approaches to problem solving. To meet this goal, pre-service teachers must gain confidence and proficiency with using and integrating technology into their pedagogy. Providing models of instruction that integrate technology and counter years of traditional classrooms allow students to have alternative models of effective teaching (Duffield, 1997).

Problem

If it is true that beginning teachers teach as they were taught, one hindrance to meeting the goal of appropriate technology use by our pre-service teachers is that higher education faculty prefer to rely on more traditional methods for

delivering instruction (Spotts & Bowman, 1995). Therefore, it is imperative to the success of this project to change the way that many college professors currently teach. Change can be hard for many people, and it can be especially hard in a population of people who are considered experts in their field. Professors need to be guided to recognize and accept that technology is not a replacement for the content of the disciplines that comprise their curriculum, but an extension that can complement that content (Willis, 1997).

Action research involves constant change and therefore is the appropriate methodology to meet the goals of this project (Stringer, 1999). The community-based action research model - look, think, act - is a cyclical set of activities involving observation, reflection, and action. Contact with faculty has paralleled on a lesser scale the action research model of the entire project.

Project Design

The three-year project entitled "Action Communities for Teaching Excellence" is designed to reach the grant's ultimate goal from several angles including: (1) providing the diverse urban student population with a supportive, consistent environment and convenient computer access, (2) converting the currently required technology course for education majors into a series of lab courses which will more closely address the various needs of education students, (3) bridging campus- and field-based experiences and resources using technological solutions, and (4) helping the faculty gain confidence and proficiency with using and integrating technology into required course instruction. Since number four involves changing the actions of people, it is the most challenging and perhaps the most rewarding of all. It is recognized that teacher educators must first acquire basic technology skills and be able to model effective presentation skills before they can enable future teachers to use technology to provide meaningful learning experiences for their students (Rodriguez, 1996). The key is how to facilitate this change.

The original plan for interacting with the fifteen professors who teach the eight targeted courses included: (1) dividing the courses among the grant project members, based first on matching the content knowledge of the course with the project member's areas of expertise, and second by the previous relationship, if any, with the specific professor, (2) contacting professors by telephone to set up appointments, and (3) reading the course syllabus before the first meeting. In fact, many of the grant project members had no previous knowledge of the professors with whom they worked. Attempting to contact by telephone often led to completely useless rounds of phone-tag, and project members discovered that many of the course syllabi were unavailable. Project members found that matching professors by course content and personality with the project team and making effective use of e-mail were useful tactics when making the first contact.

The grant project team decided that it would be best not to talk about the role of pedagogical change at the first meeting with the professor for fear of being politely dismissed. Instead, the plan for the first meeting was to (1) meet with the professors one-on-one, (2) explain the ultimate goal of the grant, (3) determine the professor's current teaching practices, (4) determine if and where instructional technology is used in the course presently, (5) explain the role and availability of technical support from others working on the grant, (6) establish an agenda for the following meeting, and (7) establish a positive relationship with the professor.

Project Implementation

There were some obstacles to overcome in the implementation of the project as originally conceived. Though some meetings did take place on campus in faculty offices, the project team had to be flexible enough to meet with professors at their convenience and at a location which they chose. For some adjunct professors who have full-time positions off campus, that meant meeting at their off-campus office or even in their home at a time convenient for them. At the first meeting, team members had not planned to discuss increasing the use of technology in the actual practice of the professor. However, it was found that many people pushed for an answer to the question, "How does your grant involve me?" This led to answering truthfully about the present use of instructional technology (IT) in their classes and possibilities for increased future use of technology. Rather than obstruct interaction with them, it freed the conversation. Several people expressed that they had little time for this grant project in their busy schedule; therefore, they wanted project members to be brief. Helping professors save time through the use of technology in support of their teaching frequently piqued the interest of a professor who was at first resistant to or skeptical about the project. It was often this hook, the intense desire to make the best use of time, which opened conversations that quickly expanded to other types of technology uses by instructors.

At this initial contact with each professor, one of the tasks of the project team was to attempt to ascertain the level of engagement of the professor. Stringer (personal communication, Aug. 15,2000) proposes that there are four levels of

engagement in persuasive arguments: resistance, apathy, interest, and excitement. The experience of the team as they worked on this project led to the addition of another level, skepticism, which was placed between resistance and apathy.

An informal analysis of the professors' levels of engagement at onset identified 64 percent at the apathetic, skeptical, or resistant level. Two months later, 100 percent were at the excited or interested level. The professors' movement through the levels of engagement was reflected in their increased willingness to meet with members of the grant project, their personal initiation of meetings and communication, and the gradual incorporation of technology into their teaching practices and assignments.

Levels of Engagement	Numbers of Professors (n=15)	
	1st Meeting	2 Months Later
Excitement	3	10
Interest	3	5
Apathy	2	0
Skepticism	4	0
Resistance	3	0

Table 1. Professor's Level of Engagement

The actual method of accomplishing movement through the levels of engagement was a combination of awakening enlightened self-interest on the part of the participants and developing a collaborative relationship between the professors and the members of the grant project team. With the initial purpose of the grant expressed by the grant team members as supporting professors' use of technology and increasing their efficient use of time, the stage was set for professors (1) to be validated in their curricular choices, (2) to be assisted in the actual technical underpinnings of a basic use of technology, such as an Excel spreadsheet/grade book, and (3) to be primed for their self-actualization as technology users through the availability of one-on-one assistance.

Professor voices changed with their exposure to team members and with tailored responses to their individual needs. One professor ended a brief meeting by swiveling around in his chair to check his e-mail while commenting, "Well, my classes are set. I don't know how your program can help me, but come back next week if you want."

A visit to the professor's class allowed two team members an opportunity to come to the next meeting with suggestions for making the professor's lecture more accessible to the 150 students in his class. That professor spent three weeks with a technical assistant developing PowerPoint presentations to facilitate his discussions. He looked forward to each lesson as he quickly saw the benefit of PowerPoint over writing on an overhead. His students, who had expressed difficulty in reading his handwriting, gave him positive feedback on his utilization of PowerPoint for his classes. In his most recent interview, this professor voiced a desire to integrate technology into students' projects to deepen his students' use of the computer as a tool for learning and for teaching their future students.

Due to the importance of the collaborative relationship between grant team members and faculty, attention was paid to both the selection of initial contact personnel as well as technical assistants. The technical assistants conducted tutoring sessions, set up grade books, put quizzes on-line, coordinated the creation of listservs, and monitored hardware and software set-ups for various purposes. Just as both curriculum expertise and personality had been factors in the selection of initial contact personnel, technical expertise and personality qualities were also relevant to the pairings of the professors and technical assistants. A professor who felt technologically deficient was paired with an experienced, patient technology assistant who could create lessons personalized to that professor's needs. Additionally, a professor who already used PowerPoint in lectures was paired with one who could proceed to digitizing video for insertion in these presentations.

One adjunct professor had an entire dissertation stored only on the desktop of a laptop computer, as she did not know how to save a backup to a disk. This same professor is now using an Excel spreadsheet for a gradebook, creating PowerPoint presentations, and looking for ways for students to create required projects by utilizing technology.

As the professor and the grant team members gathered around a computer, the common purpose led to easy conversation and collaboration. Although skills were ostensibly the focus, growing familiarity and mastery of a tool, the computer program, led to the desire to utilize it. As a result, professors spontaneously thought of classroom applications and student endeavors that could be enriched through the use of the technology.

One professor who was already a proficient personal user with lectures utilizing PowerPoint, highly developed word processing skills, and e-mail communication with students found that required reflections could be posted to a hypergroup which the grant team set up for her. A hypergroup is a specialized web site where a question or assignment is posted and students may post their replies. It can also be utilized as a listserv if students are required to join.

As the instructor became more familiar with the hypergroup, she began to use its Internet capabilities by having students post the addresses of sites that were applicable to the course so others could access them as well and share the information that had been discovered.

This desire to share their new knowledge extended to their colleagues. Faculty members who generally were isolated from their peers due to schedules, workloads, or habit became curious about their instructional counterparts' use of technology. If the grant project member was working with two different professors who taught the same course and mentioned a resource that had been effectively employed by another, a connection was made between the two professors. If one professor's hypergroup site was shown to another professor as a demonstration of various ways to employ a hypergroup to meet curricular goals, insight into both process and product was possible. Although the grant project members came from outside the community of professors, their contact with the instructors increased the intellectual communication between the professors.

As the interest grew, the grant group offered workshops in beginning PowerPoint that were open to both students and faculty. The participants expressed interest in returning for intermediate and advanced workshops. They also began requesting the use of labs or rooms with projection capability for PowerPoint presentations. In response, the grant team canvassed other departments as to their lab facilities, their use of projection devices, and the number of existing rooms with built-in equipment beyond just an overhead projector.

As more professors began integrating technology into their assignments, the question of student access was ameliorated by the reorganization of the previous course for technology in the classroom. This class was restructured into labs to allow students to address their individual technology levels. These courses provide assistance to the students in completing assignments from their education courses. They become familiar with the use of a hypergroup, are introduced to the most commonly used programs such as PowerPoint, Word, and Excel, and may work on education assignments requiring the use of technology.

Like the metaphorical World Wide Web that expands exponentially by creating connections, the grant project members are becoming links between departments within the university, between computer labs serving various departments, between professors and their colleagues, and between professors and their students. While facilitating adoption of technology into the instructors' individual pedagogy, the grant project members are becoming facilitators of change as they interact with the professors and diverse areas of the university. One surprising discovery of the team is the myriad issues that frequently impact on the education of pre-service teachers and generally have not been addressed by current procedures. This outside view of the "bigger picture" can only lead to a greater understanding of the needs of the pre-service teacher and the resources available to meet these needs.

Conclusion

Pedagogical change is the outgrowth of both the integration of technology and the development of the collaborative community created by the project. The integration of technology that provides for active participation in the learning process encompasses instructors, grant project members, and students in the process of change. Through this collaboration, the grant project members have found that many instructors of future teachers have become eagerly engaged in learning to integrate the appropriate use of technology into their teaching. By modeling technological integration and the concomitant pedagogical change, these professors are helping the future students of these pre-service teachers acquire the technical integration skills critical to success in the 21st century.

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Training Tutors Online:
Three Challenges, Three Solutions, and
Voices from the Other Side of the Whiteboard

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Introduction

If Socrates and Plato were alive today, would they still meet in the streets of Athens to probe topics with questions, or would they meet online to do so? Consider another legendary tutor Annie Sullivan, who held Helen Keller's hand under a running faucet to teach the word "water". How would Sullivan promote this type of concrete understanding online? The stories of these legendary tutoring relationships endure because they model two of the most powerful principles of learning: from Socrates, we learn that good instruction teaches students to ask the right questions; from Sullivan, we learn that meaning is constructed through first hand experience. The crescendo of the distance education movement compels us to examine the application of these theories to new, online learning environments. To that end, educators must ask: do our most cherished teaching and tutoring principles transcend the vehicles in which those principles are delivered?

By separating the face-to-face dimension from one-to-one instruction, distance educators wage unprecedented challenges to entrenched assumptions about effective learning relationships. Invoking "the human touch", opponents of distance education remind us that powerful tutoring interactions are founded on face-to-face engagement. Skeptics decry *tutoring at a distance,* and this skepticism naturally extends to *training tutors from a distance*. The virtual relationships afforded by the Internet, they argue, are inherently diluted; compromised learning, they conclude, is the logical result. Quite contrary to warnings of diluted experiences, advocates of tutoring at a distance cite inclusiveness, accessibility, personalization, scalability, and, most importantly, opportunities to build powerful learning relationships that, by subtracting the miles that separate two minds, are otherwise impossible.

This presentation focuses on challenges and solutions that emerged in the development of a distance training program for online instructors. We divide the challenges and solutions into three areas -- pedagogy, content, and relationship. We present observations from the analysis of authentic online training interactions. Our observations suggest that cherished learning principles can endure if reinterpreted within a new framework of teaching and learning.

A. Training Context: The Provider and the Technology Platform

This case study focuses on the training program provided by a for-profit organization called SMARTHINKING, Inc. SMARTHINKING's primary innovations are (1) 24/7 real-time tutor training service, provided by experts, designed to supplement collegiate-level coursework; and (2) training professors and exemplary graduate students to tutor online (we call these tutor trainees "e-structors").

The technology platform used to conduct training is an interactive whiteboard with web-based materials. An interactive whiteboard is an Internet communication tool that graphically simulates the type of whiteboard one finds in a conference room or classroom. It enables real-time and simultaneous communication via text, color, and drawing tools.

The context for this case study is the experience of training a team of psychology instructors who tutor in a faceless, interactive whiteboard environment. This presentation explores what we observed when we hired experts in the domain of psychology and asked them to use their expertise in a new environment.

B. Three Challenges: Pedagogy, Content & Relationship

Three observations – one, that online, one-to-one **pedagogy** can lapse into a fact-finding service; two, that experts who tutor in a rapidly evolving domain (like psychology) will know different and sometimes dated **content** knowledge; and three, that tutor training happens "in **relationship**" – fuel the skepticism directed toward training tutor trainees at a distance, and engender the three challenges we frame as generative tensions:

- **The Pedagogy Challenge: Training Tutors to be Cyber Librarians or Model Thinkers?**
- **The Content Challenge: Is Providing Consistent Tutoring Possible with Inconsistent Professional Profiles?**
- **The Relationship Challenge: How Can the Affective Dimensions of Face-to-Face Interactions Transfer to One-to-One Interactions?**

D. A Case Study of Solutions: Examining the Development of a Distance Training Program for Psychology E-structors

Our training program has theoretical underpinnings: our pedagogy is informed by research from fields that study *how we know* (cognitive science) and *how we grow* (developmental psychology) in educational contexts. Trainees learn by doing through interactive real-time (synchronous) and self-paced (asynchronous) activities. The online tutor trainee training and evaluation processes are comprised of 20 hours of web-based modules. Training involves six hours of real-time practicum exercises with a live trainer, 14 hours of self-paced exercises, and three hours of assessment.

A Pedagogy Solution

Let's suppose a student is studying neuropsychology. Sophisticated, three-dimensional graphics of virtual brains are mere keystrokes away if one has access to the internet. There is a danger, we believe, that a tutor will become a cyber librarian who searches well, but does not teach well.

To devise a solution to the pedagogy challenge (How will we train tutor trainees to be model thinkers, not cyber librarians?), we asked: How can a training interaction simulate a good tutoring interaction so that it metaphorically gets the trainee's hand wet, as Annie Sullivan did with Helen Keller?

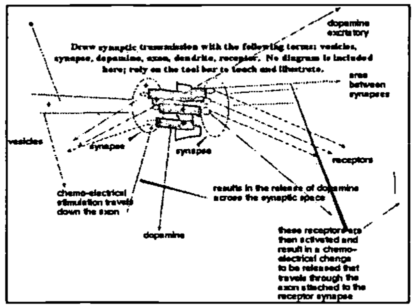
Thus, we set the expectation that tutor trainee trainees must *create*, not merely search for pre-packaged information. We predicted that tutors who respond to questions like cyber librarians, i.e. by doing Internet searches in order to help, would not earn intellectual trust from the students. This prediction informed our training protocol, and we developed slides we could load onto the interactive whiteboard that not only presented content, but more importantly modeled how we wanted that content delivered. Consider the following two training exchanges from our archives. Each tutor trainee was shown a training slide with the same task: "Draw synaptic transmission with the following terms: vesicles, synapse, dopamine, axon, dendrite, receptor. No diagram is included here; rely on the tool bar to teach and illustrate." By asking the tutor trainee to create something from nothing, we eliminate the option of doing a search – being a cyber librarian – and we set high expectations for how tutoring exchanges should ensue.

Archive #1 offers a lens into Tutor trainee MK's approach to an open-ended task. For this analysis, whether he offers reliable information in this diagram of synaptic transmission is almost irrelevant, for there are a number of visual and verbal *representation weaknesses*. First, the information is eclipsed by a disorganized approach to the task. To any viewer, the chaotic arrows are abundant and distracting; to the neuropsychology student, the multidirectional arrows obscure the unidirectional flow of electricity that characterizes synaptic transmission. Furthermore, the labels are poorly placed, too far from their referents, and too scattered to show the sequence in which neural functions unfold.

Second, key information represented in the diagram and text is not accurate (i.e. two synapses cited instead of one; receptor not accurate shape; dendrites ignored etc.) Moreover, in terms of modeling good thinking, this tutor trainee does not reveal how to approach this task in an organized sequence of steps. Although he

is encouraged to ask for help, he feigns knowledge he does not possess. Finally, he does not demonstrate the humility of an "I don't know" that tends to engender trust and risk-taking in students.

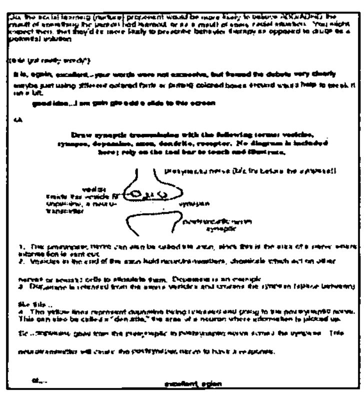
Archive 1: Tutor Trainee MK



In Archive #2, by contrast, tutor trainee AG demonstrates her expertise by delivering accurate information in a methodologically sound manner. She begins with a simple picture, not text. The picture, however, is not simplistic; she categorizes and combines labels when appropriate. For example, on the left side, her labels group the terms vesicle, dopamine, and neurotransmitter to demonstrate how the terms relate to and define one another. On the right side, her labels offer a 'big picture' by summarizing the sequence of synaptic transmission. The result is a clutter-free visual representation of the components involved in synaptic transmission.

After her picture is complete, she supports this diagram with text. Her clear prose explains the split-second process of synaptic transmission by breaking it into a sequence of steps. By choosing to number the steps, she models how to think sequentially. Finally, she concludes the interaction by summarizing the process with a single sentence. This progression – from picture to text to summary –was AG's intuitive solution to an open-ended task. Unlike the previous archive, she uses her on-command representation skills and knowledge base to create something from nothing (at least nothing more than a few terms), and thus engenders intellectual trust in the student while modeling an organized approach to the task.

Archive 2: Tutor Trainee AG



Thus, to meet the pedagogy challenge, we eschew glitzy images, for training should model what can be easily created while tutoring.

A Content Solution

Since we offer specialized assistance to students struggling through difficult college courses, we hired professional tutors, most of whom have doctorates in the academic subject they tutor. To devise a solution

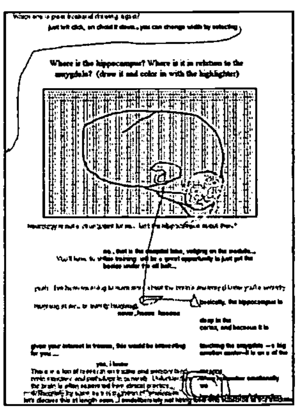
to the content challenge (How can we provide consistent tutor training despite inconsistent professional profiles?), we asked: given the variation among the education of professionals/academics, how can we compensate for the relative strengths and weaknesses of tutor trainees in subject areas so that the content-related knowledge base of tutors exists at a uniformly high caliber? We achieved this through a two-part solution: (1) top-down assessment, then (2) bottom-up training.

Top-down Assessment

In the domain of psychology, being well established professionally tends to also mean being out of graduate school for a long time. We found that a well-published scholar, in spite of an impressive resume and a thorough interview, may not have training that coincides with the revolutionary interdisciplinary changes the field of psychology is experiencing. Thus, part of our training protocol was designed to identify content weaknesses in our psychology tutor trainees.

Archive 3 shows one such interaction. The slide asks a basic brain question: "Where is the hippocampus? Where is it in relation to the amygdala?" Tutor trainee KP gives an incorrect answer in terms of shape (the hippocampus is a small tilted "U", not a large golf-ball) and location (it is in the temporal lobe, not the occipital lobe/medulla, as the trainer notes in black text). However, Tutor trainee KP prefaces her guess (red text) by explicitly identifying her academic weakness: "Neurology is not a strongpoint for me." The trainer then engages in dialogue that draws the parts correctly, explains the significance of this brain architecture, then – and most importantly – relates the significance to the tutor trainee's professional bent and clinical experience. Finally, having assessed the content area in which KP needs more extensive training, the trainer can proceed to the second step of our content solution – bottom-up training.

<u>Archive 3: Tutor Trainee KP</u>



Bottom-up Training

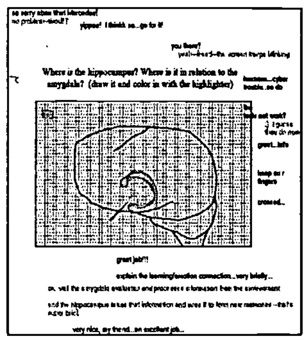
Hiring academic and professional psychologists promotes the development of a cyber think tank; we use this intellectual power to enrich and customize training. In psychology, we made hiring decisions based on a "mapping strategy" so that training, and then tutoring, includes depth and breadth of content.

By mapping well, we engage in bottom -up training in several ways. In this discussion, we look at ***strategic pairing***. Who would be a good match for tutor trainee KP? Let us contrast Archive 3 with Archive 4 below, which was completed by tutor trainee MW. In presenting this slide to tutor trainee MW, she draws both brain shapes quickly and, with accurate shape and location, has created a colorful diagram in seconds. Ostensibly, this demonstrates mere exposure to content and memorization skills. But the trainer pushes the interaction with MW, asking her to explain the significance of these adjacent brain parts,

the hippocampus and the amygdala and (black text): "explain the learning/emotion connection ...very briefly". Tutor trainee MW (red text) answers accurately, sequentially, and without hesitation. The trainer is confident tutor trainee MW will be a good match for tutor trainee KP, and in this strategic pairing, tutor trainee MW will play the role of tutor trainee when dealing with neuropsychology content, but will play the role of student/learner when dealing with trauma content, which is tutor trainee KP's area of strength.

In addition to leveling the knowledge base of our tutoring team, **strategic pairing** also builds online dialoguing skills, forges relationships, augments a sense of teamwork, and makes training adaptive.

Archive 4: Tutor Trainee MW

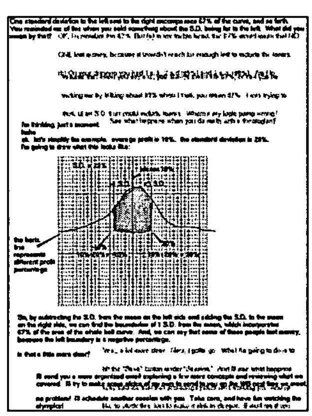


A Relationship Solution

If learning is emotional, can you create the affective dimensions of the living, breathing space shared by two people in face-to-face learning experiences?

Of the three challenges we explore, this third challenge is the most important because it addresses the conditions that drive the first two challenges – that is, teaching with sound approach (pedagogy) and sound information (content). When we communicate online, we forego the intangibles of traditional tutoring, like limbic messages, gesticulations, facial expressions, cadence, and intonation. Moreover, knowing how to promote student risk-taking without these nonverbal cues and mechanisms makes forging supportive relationships, especially in a new learning environment like a whiteboard, even more difficult. Archive 5, however, shows how this is possible.

Archive 5: Tutor Trainer FF and Tutor Trainee PC



Archive 5 shows a training interaction between tutor trainer FF, who has expertise with social science statistics, and tutor trainee PC, who never encountered statistics while earning his Ph.D. Though tutor trainee PC has over twenty-five years of teaching experience and is several decades older than tutor trainee FF, in this training session he is placed in the position of the learner.

This problem-solving dialogue opens with confusion and closes with clarity. How does this happen? When we analyzed this interaction, we realized that the psychology discussions are framed within very personal comments that share background information, feelings, and even fear. For example, PC and FF open the overall tutoring session (which includes eight slides on several topics) with some "cyber humor" as they joke about finicky Internet connections and their tutoring locations:

PC: Frank, my line's misbehaving. Be patient.
FF: No problem – we're communicating halfway across the globe after all!

We see this structure occur within the overall session, too. For example, tutor trainee PC prefaces an answer (one which reveals his limited understanding of standard deviation) with a self-deprecating comment: "In my feeble head..." After four sentences about standard deviation, he ends his explanation with a self-effacing joke that reveals his background: "See what happens when you do math with a theologian?"

Tutor trainer FF's response follows a similar framing structure. Translating emotional reactions and nonverbal actions into text, tutor FF "laughs" at PC's joke ("[H]a ha"), then pauses for reflection: "I'm thinking, just a moment." After this pause, he offers a technical diagram and explanation, invites PC's feedback, but still closes with a personal comment -- one that reinforces his awareness of PC's home near Australia, site of the summer Olympics: "Have fun watching the [O]lympics!"

The interaction, therefore, does not confine itself to the learning topic – in this case, the technicalities of standard deviations. Self-deprecating remarks, humor, and pauses, then, are not inefficient or tangential; rather, they are essential for establishing rapport and promoting learning.

F. Concluding Remarks

Our analysis of these challenges begins to reveal the complexity of our initial question: Can good teaching principles transcend the vehicles in which those principles are delivered? Although this case study brings us a step closer to understanding the ways in which online interactions can help learners ask good questions and construct meaning through first-hand experience, the analysis provides no definitive answers, and in fact raises more questions. Future research might focus on the following:

- How, during online synchronous interactions, do individuals convey thoughts that are typically internalized in face-to-face environments?
- Does the nature of a dynamic, synchronous interaction change once it is archived? If so, in what ways?
- Are students learning in these online environments? If so, how are they learning, and to what extent is this learning different from traditional face-to-face environments?

While we are not in a position to quantify or qualify the nature of learning that transpires in these new interactive online environments, we can make one distinction – that is, the opportunity to *return*. The essence of this opportunity is captured in the closing remarks trainee PC to trainer FF (Archive 5): "What I'm going to do is hit the "Save" button under "Session" and I'll see what happens...I'd like to study this, just to make it *sink in deeper*."

Changing with the Times: The Evolution of a Faculty and Staff Web Development Program

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Abstract: Educational institutions have a responsibility to provide faculty and staff adequate training in web development so that faculty, staff and the institutions they represent can communicate their ideas, information, course content and activities over the Internet. The key to successful implementation is to deliver the training in such a way as to make faculty and staff want to participate in the training, as well as to make the training relevant, and to encourage continual development once the training has been given. St. Philip's College has structured its curriculum to facilitate the adult learner in such a way as to remain flexible enough to meet the emerging needs of each individual interested in pursuing web development. Discover how the web development program at St. Philip's College has changed with the times, and has evolved to remain relevant and valuable to those it serves.

TEACHING WITH TECHNOLOGY: STAFF DEVELOPMENT THROUGH A TURNKEY TRAINER MODEL

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ABSTRACT

Using a PowerPoint presentation, the Associate Superintendent, a fifth grade teacher and a high school English teacher will demonstrate the key ideas and themes of the staff development Turnkey Trainer Model and its applications and benefits within the school district. We will discuss the "administrative" role of the model (*budget, implementation of the turnkey trainers—choosing the "Teacher Technologists"*) and will present the ***trainers in action.*** We will explain how the staff development sessions are conducted; how encouraging reluctant staff builds trust and willingness to try and learn; how continuous support and growth enable cooperation among faculty, as well as between buildings. All presenters will discuss obstacles, challenges and strengths of implementing technology into a school district. The discussion will be supported with handouts of successful staff development workshops. A question and answer period will follow the presentation.

DESCRIPTION

Continuous training has been the key to keeping up with the advancements and changes with technology in the education field, especially with the inclusion of the Internet in many of the new learning standards. The needs of the teachers must be met if a district wants to successfully implement the use of technology. The Turnkey Trainer model, which supports the technologies and has continual training, can only lead to successful teaching and learning in the classroom. Staff development can make a powerful difference for students and teachers alike. Although districts may have different demographics, the problems facing districts, in regard to staff development and technology, remain the same. Effective teaching with technology can only be accomplished if districts devote money, time and opportunities for further training of the staff.

OBJECTIVES

The presentation will provide an overview of a staff development model that supported a district wide implementation of technology in our school system. Turnkey Trainer Representatives (**K-12**) and the Associate Superintendent for Personnel and Technology will explain the model. Issues such as: *linkage to curriculum, budget, and variance in teacher technology skills* will be addressed. Other issues that will be discussed are: how staff development activities, in-service programs and summer technology academies increased the skills and use of technology in the classroom by integrating the technology, in particular the Internet and intranets, as tools into lessons. This interactive session will allow for discussion among presenters and participants—the best way to learn about implementing technology and teacher training is to discuss various models and methods that have proven effective.

ACKNOWLEDGEMENTS

The presenters wish to thank the following: the West Babylon Board of Education; Superintendent of Schools, Mr. Mel Noble; the West Babylon faculty and administrators, and the West Babylon Community for their support in bringing technology to the children.

The Carrot or the Stick: The Development of Faculty Technology Competencies

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Abstract: The School of Education at Indiana State University put forth a requirement that all faculty who requested new desktop computers must meet a set of established faculty technology competencies. The goals were to use a velvet glove in order to ensure that faculty can perform the same technology competencies as students, ensure new technologies are used to their fullest, identify those persons who needed training and assistance, and build departmental awareness of potential technology mentors. The competencies are a work in progress that have been ratified by SOE governing bodies, but are still working toward true implementation.

Background on Faculty Competencies

As technology advances, it also advances on the educational community. Reflective in this movement is the development of technology standards for many in education. For example, the International Society for Technology in Education (ISTE) has developed the National Educational Technology Standards for K-12 Students (ISTE 2000a) as well as the National Educational Technology Standards for Teachers (ISTE 2000b). The State of North Carolina has led the way by the creation of a list of basic and advanced technology competencies for professional education faculty and students. Using this core list of competencies, UNC-Charlotte's College of Education developed a set of assessments, formative evaluations, and feedback for their education faculty (Algozzine et al 1999). Given the backing and encouragement of state mandates, this full process worked well for UNC-Charlotte. However, given the pressing demand of standards for our teachers and other students, and a lack of state guidance, Indiana State University's SOE ITAC embarked on a new venture to develop its own faculty competencies.

Creating the Technology Competencies

The reasons for the establishment of faculty technology competencies were fourfold. First, a number of student competencies for undergraduate, masters and doctoral students had been passed by a variety of governing bodies on campus. For pedagogical reasons, it was important to know that faculty could achieve the same level of competency as their students. It is a commonly accepted truth that teachers teach as they themselves have been taught. Therefore, to have graduates that can successfully integrate technology into their classrooms or professional lives, they must first have effective models of technology integration in their faculty.

Despite the best intentions behind the pedagogical reasons for technology competencies, the efficient use of new technology purchases was the reason that "sold" the idea behind the development of faculty competencies. Faculty and staff throughout the SOE were frustrated at seeing high-end technology sit unused on faculty desks, or worse, being used merely as a high-end typewriter or solitaire partner. As technology dollars continue to diminish in relation to need, it seems prudent to assure that technology expenditures go where the needs are the highest and/or individuals are willing to improve skills.

Third, if we truly want to improve skills, then we need to target the deficient skills of individuals. Since the technology competencies are essentially a self-assessment of skills, individuals (in conjunction with their department head) can identify deficiencies in their technology skill set. This information, which is then passed on to ITAC, is crucial in creating targeted training.

Finally, greater awareness of where a department's technology "strengths" might be will encourage individuals within a department to seek peers for assistance. Being able to turn to a colleague for just-in-time assistance lessens the demand upon IT support staff and provides potentially more immediate, and relevant response.

During the Spring of 1999, each department was requested to develop a set of competencies for their faculty and staff. When faculty/staff from that department requested a new computer, the department would need to provide documentation to the technology committee that identified the specific competencies the faculty/staff member had and what specific skills they needed assistance in achieving. Faculty/staff do not need to be fully proficient in order to receive a new machine; rather, the goal was to be able to identify departmental-specific skills needed to help plan for professional development workshops and training. Documents were created and collected from each department by departmental representatives on the technology committee and forwarded on to the Dean for approval. By the end of the academic year, the Dean approved all departmental documents, and they were placed on the SOE website (http://soe.indstate.edu/itac/).

Reflection on the Process

As stated earlier, the competencies have the power to help bring about true technology literacy by placing standards on faculty similar to those expected of students. The "carrot" of a new computer is merely an incentive to encourage faculty, staff, and department heads to work with technology competencies. When the process is taken seriously, everyone can benefit – the departments, faculty, the school, students, etc. However, this process is seen by some to be one additional hurdle that must be surmounted, one way or another, in order to achieve the prize of the new desktop computers. To make the process work, and to make it palatable to everyone involved, academic integrity is a key element. Unfortunately, some ITAC members know of instances where faculty competencies were signed off upon without any intention of enforcing the spirit of the competency guidelines. Since little direct evidence exists, ITAC continues to work on this issue to ensure that faculty technology skill continues to increase in order to meet the needs of our students.

Conclusion

This process has been in place in the SOE for only one year. As this paper is being written, the process of certifying technology competencies is about to begin again. Through the lessons learned the first time around, ITAC is working to improve the process. One way is by sharing some of the more efficient, streamlined competency documents with other departments. Another way is by finding better ways to ensure that competencies are met, and ensuring that as the existing and required skills of our students increase so do faculty skills. The SOE is committed to the knowledge that having strong technology skills in our faculty will have ultimate benefits to our greatest asset, our students.

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Empowerment of Personnel to Survive in an IT-enabled Organisation and an e-World. (A South African Perspective)

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1 Introduction

In this dynamic decade, a University that is successful in future will be one that has planned for the future early enough to have been able to change its strategies, business and operations according to the demands of the country and the people (clients) at that point in time. It will continuously envision its future in such a way that it will keep adapting its strategies to profit optimally from the technological and learner-related developments of the present and future ages in order to remain a viable institution.

In practical terms it means that the successful University of 2005 will have envisaged the driving forces of the e-world, globalisation and life-long learning. It will have changed its strategies, business and operations in good time, and keep adjusting them in such a way that the University will also prosper in the long term.

One of the most important success factors of the e-enabled University is IT-skilled faculty and staff. IT alone won't do the job. It needs to be placed in the hands of knowledgeable, skilled and creative people with a clear focus on their job. This applies to both faculty and staff, and not only to IT staff. Personnel need to have general as well as specialised skills, appropriate to their specific roles in the enterprise. Without these skills, technology is often blamed for failures, and the enormous investment in IT will be wasted. Without a paradigm shift in the appreciation and role of technology, it will simply become part of the problem of rising costs, instead of becoming part of the solution.

2 Technology trends

The global trend towards e-business is fuelled by dramatic technological improvements and a shift in business economics. The extremely fast pace of technology development and product evolution is also stimulated by increased competition in the IT industry. The pervasive use of especially the microcomputer for business as well as leisure and entertainment is creating huge markets for the IT industry. Any business that wishes to survive and thrive in this new cyber era will have to take serious cognisance of these developments. Trends like

- the internet and World Wide Web
- affordability and power of the workstation and laptop
- penetration of technology in the everyday life
- the human/computer interface
- real multimedia
- knowledge management
- the dominance of Microsoft
- licensing of application programs
- virtual support
- technology based learning
- collaboration (partners, components, etc.)
- personalization

- technology in the library
  - electronic journals
  - databases
  - conglomerates

create lots of opportunities, but without a solid base of IT-skilled personnel, universities will experience these trends as threats.

3 Penetration of IT in Universities

	The good old days (Only 10 years ago?)	The technology enabled university in an e-world
Faculty	• Board and chalk • CBT or Computer Based Training was mainly text based and not widely used . • All pre-graduate full time students were on campus. • Research were characterised by books, papers, hand experiments and computers were mainly used for statistical analysis, word processing, simple simulations and some email. • The typical secretary used a computer mainly as an intelligent typewriter. • Meetings were scheduled by hand and very little email was used to communicate and pass information on.	• The focus is not on teaching any more but on learning. Self-paced and self-managed learning is common. • Lecturers make more and more use of technology to enrich the sessions they have with students. • Students are on campus as well as off campus, some in very remote sites. Our university has over 50 remote sites and study centres at the moment. • PC's are everywhere: in hostels, PC labs, homes, etc. • Web enabled courses are available. • Lectures communicate with their students via email and discussion groups. • The Internet is indispensable for research. • Knowledge can be managed and is easily available. • The research process is automated. (Research Toolbox). • Rich documents are created and almost immediately available worldwide. • Secretaries keep themselves busy with Document imaging and Document management. • Secretaries keep electronic diaries and schedule meetings with large groups within seconds. • Secretaries use the web to make reservations.
Support	• The IT department supported only basic accounting, personnel and student administration systems, used by only a selected few. • On the PC side DOS applications were used and there were little integration and other potential complexities between	• We deal with complex integrated business systems interactively used by everyone • Applications run under Windows 95, 98, NT, 2000, Linux, Unix • The LAN is used extensively by everyone.

	applications. • The mainframe computer was still up and running, there were one or two Unix boxes and the LAN was quite small. • In 1990 our University only had two PC laboratories with 30 PC's in total. PC's were only used by computer science and engineering students.	• Four hundred PC's in 10 PC lab's used by students in all faculties
Other	• Student registration at the start of the semester was a painful process and took days. • The library had a very basic catalogue system and some search facilities. • Student cards were still "dumb"	• Intelligent student cards used for access control as well as a debit card. • Web application and registration. • E-Library. • Video/data operated security gates. • E- access control in every building.
Management	• Management information was prepared by skilled IT staff and reports were produced only on paper. • Top management was computer illiterate. • IT did not influence strategic decisions and directions.	• Accessible knowledge databases. • More computer literate and active users of notebooks, internet etc. • IT is represented at top level.

IT is everywhere - On campus, in the hostel, at home, overseas.

IT is used by everyone - From the gatewatchmen to the Principal

IT can be used anytime all the time - 24*7*365

One of the most important success factors of the e-enabled university is IT-skilled faculty and staff. IT alone won't do the job. It needs to be placed in the hands of knowledgeable, skilled and creative people with a clear focus on their job.

4 Empowerment of personnel

4.1 Scope

To optimally utilise the potential of communication and information technologies, whether primarily on-campus or at a distance, requires high-level relevant skills. Three types of skill sets are necessary for personnel:

- **A sufficient level of technical and manipulative ability** to be efficient and comfortable with the operation of a networked PC and software applications (refer to levels 1 and 2 in the diagram below)
- **High-order pedagogic skills** for faculty (this skills set constitutes level 3 in Figure 1)
- **Skills of university management** which is aimed at heads of departments, deans etc. (level 4 in diagram)

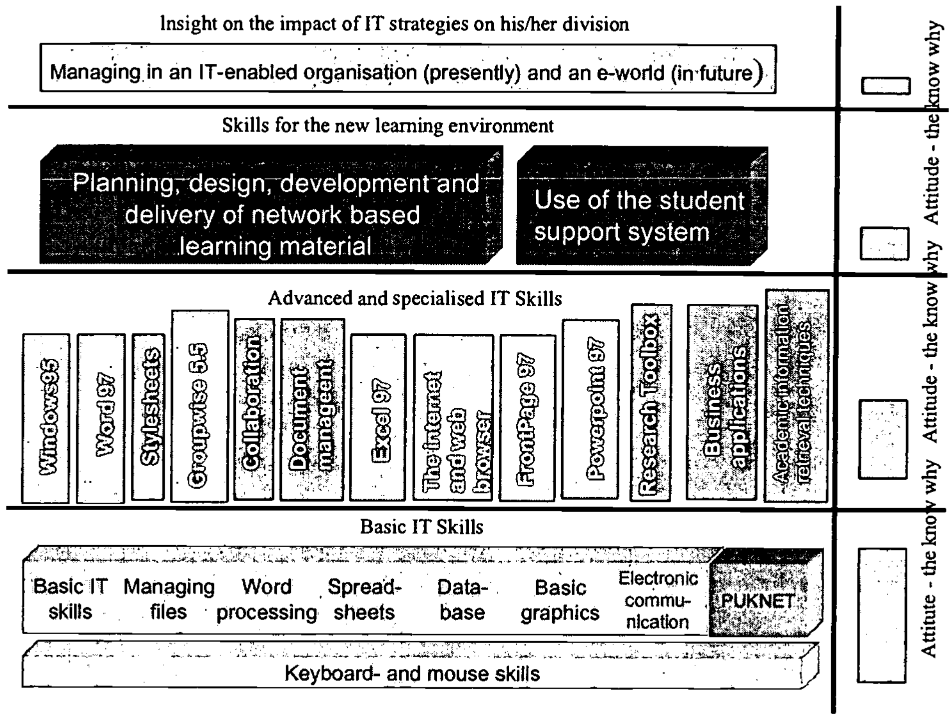
4.2 Objectives

The objective of this project is to enhance the IT skills of all personnel members, but more specifically of faculty, in order to empower them to work effectively in the new flexible learning environment.

4.3 Strategies

4.3.1 The four-level approach (WHAT)

Figure 1: The four-level approach



It is very important to start with basic skills. Whenever one wants to develop network based learning material and deliver it in the student support system you have to be able to use Word 97. To be able to use Word 97 one at least has to have keyboard and mouse, basic IT, management of files, stylesheets and PUKNET (University local area network) skills. Depending on the material, you probably need to know how to work with spreadsheets and basic graphics. Just to prepare very simple learning material you need to be skilled in at least 5 areas on level one and at least 2 areas on level 2. To be able to deliver this course in the student support system you need to know how to plan, design, develop and deliver network based learning material, what the student support system offers you and how does it work, how to work with email, the internet, a browser etc. Thus to deliver a course you need basic, advanced and specialised IT skills as well as skills for the new learning environment.

Parallel to this it is very important for personnel to know why they are doing all this. Why is it important to use the intranet and internet to deliver courses, why do I need the skills, how does my profile look, etc. We intend to develop courses in this regard starting from level one.

The fourth level of the model is aimed at heads of departments and deans. It is important for them to have insight on the impact of IT strategies on his/her division.

Other areas we feel it necessary to be skilled in over and above the ones I have mentioned is the following:

- Document management – Just about all documents and therefore learning material are produced using a computer. The knowledge of the university is contained in these documents and it is therefore important to manage it. Documents need to be stored centrally and managed accordingly.
- Research Toolbox – This is a product we use to make sure that a standard basic research process is followed and it is especially used by first time researchers. It also gives a research director easy access to all his/her research projects.
- Business Applications – The student support system will be tightly integrated with the business applications and therefore allow à student to access his/her exam results, financial information etc. through the student support system. Faculty and administrative staff will be faced with questions in this regard.

- Academic Information retrieval techniques – there are a wide world of information at your fingertips. You need to know where and how to search for these information.

The actual skill profile of various staffmembers will differ but it is important to mention again that every staffmember, from the gatewatchmen to the Principal, need to be skilled to survive in an e-world and ride this new wave.

4.3.2 Implementation strategy (HOW)

4.3.2.1 Phased implementation

4.3.2.1.1 Phase 1

Implementation of levels 1 and 2 of the model.

4.3.2.1.2 Goals

1) To be learner-centred 2) To start the profiling process 3) To include assessment as part of the learning process 4) To be able to have management information at hand timeously 5) To register the courses with the South African Qualifications Authority.

4.3.2.1.3 Progress made

We have outsourced most of the level 1 and 2 courses to a private company called Boston Business College. We allocated our IT training room and all the equipment in that room for this purpose. In exchange for that Boston Business College offers the courses to university staff and faculty at a very low price.

At first we used a central budget to finance the project but after two or three months we decided to pass on the costs to the departments. Since May 2000 when the project was officially launched, 903 courses have been enrolled for. This is at least three times more than in the past.

The huge success of phase 1 is partly because learners receive a nationally accepted certification after successfully completing the course and because they can learn at their own pace, whenever they want to. At this stage learners still have to physically go to the training room but all the outsourced courses will be available on our intranet in the 2nd quarter of 2001.

4.3.2.1.4 Phase 2

Implement level 3 and the Attitude part of the model.

We are still busy planning this phase and have not really started any structured course. The planning, design, development and delivery of network based learning material is the responsibility of the Bureau of Academic support services and they plan to implement a course 3rd quarter of 2001. At this stage they help faculty on a one on one basis.

The student support system, which we developed ourselves in association with a private company, will be ready for implementation early in 2001 and therefore we will start the course only in 2001.

4.3.2.1.5 Phase 3

Implement level 4 of the model.

We are still busy planning this phase and have not really started any structured course. We are still not sure what the format of this course should be. It will probably be a combination of material, information sessions, discussion groups, etc.

It is important to notice that it is not only the IT department who is involved in the implementation of this model but also Academic Support Services and the HR department.

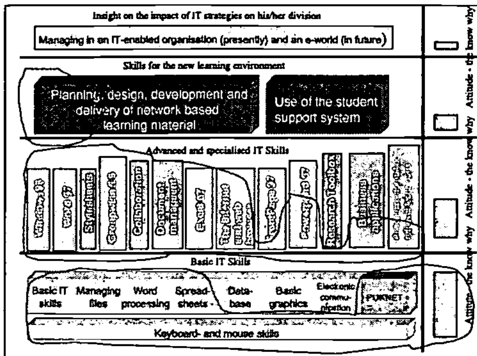
4.3.2.2 Faculty and Staff Skill Profile

The model focuses on all personnel and not just faculty, but the third level is mainly focused on faculty. We are aiming to have an IT skills profile per post. For example, a faculty secretary will have a profile that will include level 1, certain skills on level 2 and perhaps skills on level 3, whereas a staff secretary won't need skills on level 3.

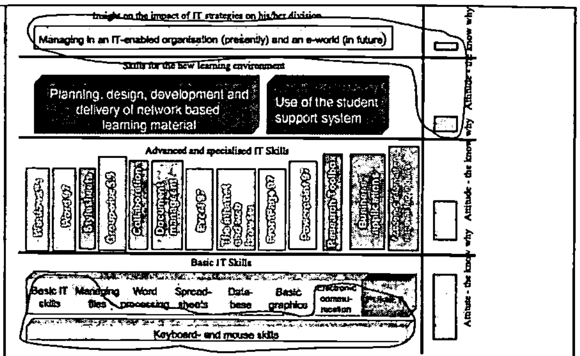
It is very important to work closely with the human resources department as well as directors/managers to define these profiles. As the requirements change, so will the profiles.

These profiles will also form part of the appointment process of personnel and the yearly performance evaluation.

Figure 2: Typical profiles.



Example of a "Secretary profile" who assist faculty to deliver courses in the student support system



Example of a "Dean Profile"

4.3.2.3 Assessment

Assessment and certification is a very important aspect of this model. This is the only way in which one can measure skills. It is not necessary for anyone to attend a course. If the learner thinks he/she has enough knowledge, he/she can write a pre-test or do the formal test without doing the course.

4.3.2.4 SAQA and NQF accreditation

The new South African constitution provides for a structured approach to education and training of employees. Each organisation has to report to the South African Qualifications Authority (SAQA) regarding in-house courses for personnel, courses (in-house and external) personnel has finished over a period of time, cost etc. What is important for us is to register all our courses with SAQA. This is the only way in which the university can claim back a percentage of the funds it has paid over to SAQA.

Although this report back every month is a lengthy process, it force you to evaluate the training of personnel every month. In a certain sense it was much easier for us to implement this IT-Skills model within the broader framework of the NQF (National Qualification Framework) because they have already set the table.

4.3.2.5 The Budget

Although we started off by allowing anyone to register for any course for free, we quickly realised that this was the wrong approach for the longer term. But for a start it was easy to get personnel involved and excited about the project.

There is a central budget approved for 2001 but we will only subsidise departments. In the longer term when the profiling has being done each department will have its own skills development budget because they will know exactly what their needs are.

4.4 Statistics (The past and the present)

In seven months 903 courses have been enrolled for, compared to approximately 400 per year in the past. This is significantly more and can be ascribed to:

- The fact that learners can learn at their own pace, at their own time as long as they want to.
- Assessments and certification
- Good marketing strategy of the outsourced company
- Central budget

Figure 3: Number of personnel enrolled for different courses

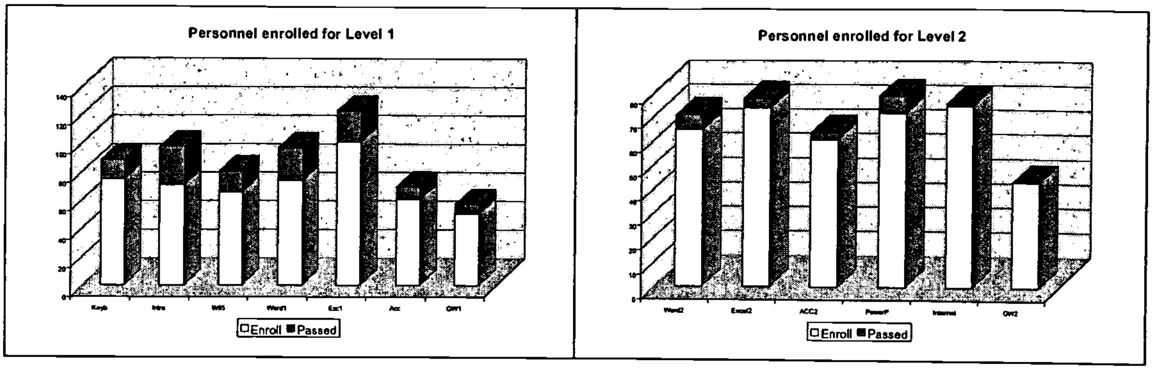
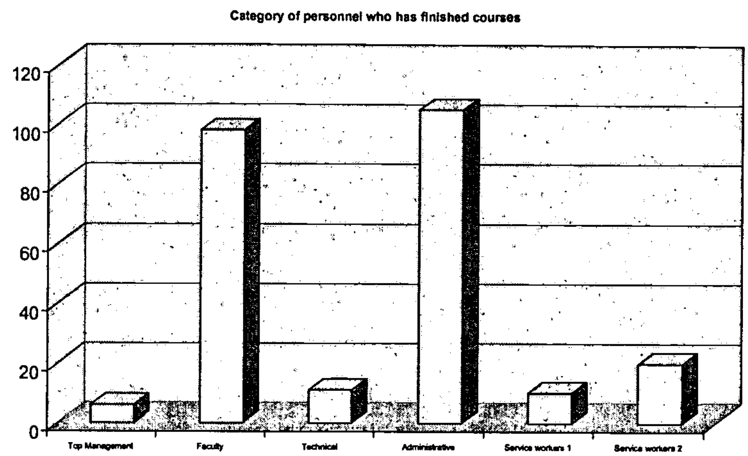


Figure 4: Occupation category of personnel who has finished courses



Just to repeat what I said in the beginning: The skill development model was not aimed to accommodate just a specific group of people. Although Faculty and Administrative staff make out most of the learner population, top management on the one side and service workers on the other side are also involved.

5 The future

We are planning to give more structure to the project in 2001 by:

- Formalising the profiling in co-operation with the HR department.
- Work out strategies to integrate personnel training and performance evaluation.
- Implement Levels 3 and 4, the attitude courses and the others which we haven't implemented yet.
- A secondary objective of the project was to relieve some pressure off the IT Help Desk. We will evaluate that.
- Adopt the model as time change.

Articulating Technology Needs To Administrators And Policy Makers

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Abstract: There is a continuing disconnect among those who recognize the value and growing needs associated with technology-related innovation and campus administrators and policy makers who are in charge of overall budgeting and resource allocation. How does one communicate effectively within the context of the administrative framework of a college or university? When making funding requests to those who may be less familiar with specific aspects of information technology issues, one should 1) make data-based requests, 2) speak from a global perspective, and 3) consider administrators' priorities.

Introduction

There is a continuing disconnect among those who recognize the value and growing needs associated with technology-related innovation and campus administrators and policy makers. These needs may involve instructional and information technologies as well as needs involving personnel, equipment, space, line-item budget support, and numerous other issues that involve communications among technology personnel and administrative and policy leaders who are responsible for the allocation of resources. There are varying levels of technology sophistication among administrators and vastly different levels of economic and priority interests existing on college and university campuses. The following information is provided to assist faculty and staff in preparing funding requests when the technology experts are not necessarily those in charge of overall budgeting and resource allocation.

How does one communicate effectively within the context of the administrative framework of a college or university? As a practical consideration, keep in mind the serious challenges that higher education is now facing. Institutions are in a perpetual financial vice (Selingo, 2000) with tuition rising along with increasing financial needs. Many of these financial needs are technology related (Market Data Retrieval, 1999). Imbedded within economic and quality issues is the need to consider three areas when developing requests for technology resources. When justifying requests requiring new or redistributed resources it is important to 1) make data-based requests, 2) speak from a global perspective, and 3) consider specific priorities of busy administrators.

Make Data-Based Requests

There is a tendency for many administrators to become consumed by details involving accreditation, system reporting, performance and enrollment data, student and faculty concerns, and other daily occurrences. Funding requests that do not provide specific detail are often lost in the daily "shuffle." It is important to approach administrators with meaningful data to explain or support innovative ideas and concepts (Bradford & Duncan, 2000; Hafner & Oblinger, 1998). It is essential to use specific information to support a particular funding request. When appropriate, information from system, state, regional, or national data makes an excellent basis for explanations and comparisons. The constant evolution of instructional technology

guarantees that the pressure to spend will continue to rise. Examples that include references to peer institutional group data will help make particularly compelling arguments in support of specific requests.

One excellent source for such information is provided by the COSTS project (McCollum, 1999). The project provides detailed data from a survey of 100 colleges and universities. The survey gives useful descriptions concerning what peer institutions are doing with technology budgets. This data allows administrators to see technology costs as compared with comparable institutions. This data is useful to administrators who must justify their budgets to supervisors who may not have a clear sense of how much technology should cost. Such data allows administrators to put spending requests into perspective.

Speak From a Global Perspective

Policy makers operate within an environment that usually includes multiple interests that compete for attention, resources, and priority within the institution. In this context, a global perspective may mean considering ideas, plans, and projects that appeal to or address needs across a region or state. However, thinking from a more broad-based perspective is also helpful for campus-wide efforts. Technology needs can easily drift beyond college or departmental boundaries. Focus on ideas that will benefit multiple groups (students, alumni, faculty, staff, other institutional partners, etc.) and future efforts. Requests that have potential benefits for more than one department or college or community agency increases the overall value and appeal of a request. Link requests to university or departmental or college mission statements and technology plans whenever possible.

Consider the Administrator's Priorities

One of the least understood and often overlooked considerations involves numerous, frequently unspoken factors that are generally recognized within administrative ranks, but are not always apparent to faculty, staff, and others who operate outside the administrative circles. Consider the time pressures under which most administrators operate. When meeting in person, use a written agenda and keep within the time scheduled for your meeting. Demonstrate an organized approach that reflects a serious, planned presentation. Be prepared to describe your successful experience with related projects. Frequently, the best predictor of future behavior is past behavior. Give the administrator a reason to believe you will be successful with the proposed project.

When scheduling appointments to discuss funding requests, pay attention to situations that may divert an administrator's attention away from your needs. Time sensitive conditions exist for campus leadership and these can cause delays or less than full consideration of requests. Be sensitive to issues and deadlines that could cause an idea or request to receive less than adequate attention.

Provide an executive summary of your request that provides enough detail without creating an additional time burden. Written material should be as concise and as free of jargon as possible. The language of technology can be unclear to those not as familiar with a particular topic. Do not camouflage good ideas among the jargon of the latest innovation. Use bullet points, charts, and graphs to reflect important concepts. Clearly describe the group to be served by the project, the importance of the project, the results you anticipate, and provide a specific breakdown of the funds requested.

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Faculty Development in the College of Education

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Abstract: Faculty development in the college of education has changed and evolved over the last several years. In the beginning, faculty received technical help from the technical support staff, but had little support at the curriculum integration level. In the fall of 1999 the College of Education embarked on a technology training program. This program was offered to all faculty and after completing 16 hours of training the participating faculty members received a laptop computer. This training program was offered through the central academic computing center, a university-wide agency. This program was deemed a great success and the faculty left happily with their new computers. But, what really happened? We found that the faculty did not learn as much as we thought and they thought. A second program was developed. Similarities and differences between the two programs are discussed. Hopefully the experiences and development in this program will help others in the area of faculty development to better train and educate their faculty in technology and enable faculty to embrace technology in new ways.

Background

Faculty development in the college of education has evolved over the last several years. In the beginning, faculty received technical help from the technical support staff, but had little support at the curriculum integration level. In the fall of 1999 the College of Education embarked on a technology training program. This program was available to all faculty. The faculty partipants, after completing 16 hours of training, received a laptop computer. This training sessions were offered through the central academic computing center, a university-wide agency. This program was deemed a great success and the faculty left happily with their new computers. But, what really happened?

Phase I

For discussion purposes, this program is referred to as Phase 1. The major emphasis of Phase 1 of this program was on the skills level. Courses were offered in webpage development, Adobe Photoshop, PowerPoint, etc. Faculty registered for these workshops based, not on knowledge of the capabilities or the relevance of the software, but on the title of the session, and scheduling convenience. Consequently,

although the faculty successfully completed these workshops, they had little understanding of how to apply these skills to their teaching and little connection actual needs in their classroom. At the time of the training, faculty seemed pleased with what they had learned and gave very positive reviews of the program and the sessions. Now, just a few months later, we are questioning what the faculty really learned. A review of Phase 1 training concluded that:

- Many participants stated that they don't remember anything that they had learned in the training
- Some participants still need support in areas in which they received more than 12 hours of training.
- More consultations needed to be done with faculty to ensure they were enrolling in a workshop relevant to their skills level, and contextual needs.

These observations and others forced us to rethink our faculty development program, and led to additional questions. Were they using their newly acquired hardware in innovative ways? Did this change the way they teach or at least provide a convenient way for them to use technology for administrative purposes? Not really. Some of the laptops remain in their cartons. Why did this happen when the program seemed so successful? This remainder of this paper describes an alternate program currently being offered and explains the differences and why it has the potential to be more successful. This program is called Phase 2.

Phase 2

When trying to understand why a group of people adopt technology at different rates, we look to the research in the field. According to Everett Rogers, in his book Diffusion of Innovations (1983), there are four components of innovation diffusion: the innovation itself, the time-frame for adopting the innovation, the social system within which the innovation is diffused and the communication of the innovation from one individual to another. Rogers defines individuals on a continuum from innovative to laggard, and classifies them into five different adopter groups. The classifications are: innovators, early adopters, early majority, late majority, and laggards. The faculty of the College of Education can be placed in each of these classifications. The innovators and early adopters have been using technology for years before organized training took place. Since the entry-level training workshops probably didn't meet the needs of these groups, they were given the option of learning something new on their own in order to obtain a laptop. The faculty development programs were primarily targeted at the early majority, late majority, and the laggards. Phase 1 met the needs of the first three groups, the innovators, early adopters, early majority, but the last two groups were left on their own.

According to Hall and Loucks (1978) Staff development can best be facilitated for the individual by use of a client-centered diagnostic/prescriptive model. Too many in-service training activities address the needs of trainers rather than those of the trainees. Based on what we learned from faculty coupled with the research on change, and innovation diffusion we evaluated Phase I and made some necessary changes to the program.

Similarities exist between Phase I of the technology training program and Phase II. For example, faculty completing 16 hours of technology training will receive a laptop computer, all workshops are done in a hands-on environment where faculty sit at the computer and work. Both Phases consisted of workshops that are independent of each other, usually covering one topic at a time and spans either one session or two.

The way in which the workshops differ are many, and profound. First of all, a smaller group of professors participated in Phase 2 and received more individualized attention. Before the training began, each participant had an initial consultation to determine exactly what the professor was interested in learning and how they would like to use technology in their teaching. Their specific needs determined which classes would be taught and in what order. Participant feedback was extremely important in the formation of the program and in workshop development.

Another significant difference between the two is in the instructional delivery mode. Phase 1 consisted of a "watch and then do" model. "Click on File, then open." Instruction consisted of learning the different menus and how the software worked. Phase 2 is less structured and more hands-on. The participants were given a project or problem that they had to work on and figure out how to use the software for the project. Of course, some guidance was given. The focus was taken away from the specific software application and put on using the software to solve the problem at hand. The goal was to teach the participants how to "tinker" with software and find what they are looking for, instead of every action being dictated to them. This teaches the participant to learn how to use the software instead of learning to follow

a recipe or follow simple instructions. This isn't always an enjoyable way to learn, but in the end the participants did feel like they were learning something.

Every workshop in Phase 2 focuses on creating a meaningful project that is contextual to the needs of the participants. Every participant did not walk away with the same thing. For example, some professors created web pages for their courses, others created a personal web page. This made the workshops more meaningful to them and more applicable to their needs. We believe another significant reason why the content of the workshops is better is that the teachers and developers of Phase 2 are from the College of Education, not a central university agency. This is important because the trainers are more familiar with the type of teaching that occurs in this college.

Conclusions

At this time, Phase 2 is still being implemented, therefore long-term outcomes cannot be measured. However, a follow-up plan has been developed to see how the workshops have changed the way the professors use technology personally and in their teaching over time.

The purpose of this paper is to help others in the area of faculty development to better train and educate their faculty in technology and get the laggards to embrace technology in new ways.

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Introducing Tutor Professor to Online Distance Education: By Online course

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Abstract

This paper discusses the development of tutoring guidelines for tutor-professors in the Virtual University of Monterrey Institute of Technology (ITESM). The purpose in discussing these guidelines is that they may be relevant to teaching in any online environment. We also developed an online course for tutor professors considering these guidelines.

First, we developed a tutoring guide because our instructors were not used to teaching online. We feel that our experience in designing this guide could be useful for others working in technology-based distributed learning environments. This guide is not a "recipe", but a set of recommendations that we hope tutors will use as a reference and apply appropriately to their educational context.

We created these guidelines and recommendations, so the tutors can use it and perhaps they could save time and resources, and focus their functions in accordance with the institutional philosophy, course learning outcomes, and technology use, etc. because they will be more involved with many ideas suggested here and these ideas could help them to achieve these advantages.

It is important to consider how well prepared new professors are for online teaching when they begin their teaching duties because they may not be familiar with the ITESM context. We need to provide guidance for them to review deeply some premises or assumptions. For instance, are they familiar with our institution and its mission and philosophy? Are they

aware of the different cognitive strategies that can be used to facilitate students' knowledge acquisition. Do they know how to use Web-CT, Learning Space, etc.? (the web-based course development and delivery environment). We developed these guidelines and recommendations to improve online teaching at ITESM by making it consistent with the institutional philosophy, course learning outcomes and technology use.

In an attempt to improve tutor performance in online teaching we produced an online course where professors could live this experience and also could be prepared in their duties as a tutors in this kind of distance education model.. This online course was developed by searching different bibliographic references and through discussions with experienced online tutors.

The course includes topics related with Distance Education, learners in this context and also different *Recommendations for Tutor Professors in the Virtual University.* It is our hope that after taking this course the tutor professors will achieve the following objectives:

1. Know and understand the Monterrey Institute Technology mission;
2. Review and apply the Virtual University policies;
3. Work collaboratively (with the team who designs and develops the course);
4. Learn how to use technologies (Training);
5. Manage their time effectively as tutor professors;
6. Plan their courses effectively, considering virtual environment conceptualization, satellite sessions/videoconferencing with UBC, learning approaches, online activities, evaluations and special projects;
7. Incorporate instructional strategies in order to follow the ITESM mission;
8. Know how to create a communicative environment with their students;
9. Manage and control the course administrative affairs;
10. Motivate their students by creating affective links, and performance awards;
11. Give meaningful and timely feedback;
12. Know how to moderate online discussion forums;
13. Evaluate the learning-teaching;
14. Stay up to date in their professional field;

15. Foster and develop research projects to enhance distance learning environment.

The online course will be updated regulalry with tutors′ experiences in order to stay abreast of this rapidly changing field.

On the other hand, we design an online learning environment –training area- so tutor professors can acquire knowledges, but also develop the necessary skills and attitudes. This virtual learning environment was developed considering the guidelines for tutor professors and we would promote interaction amongst tutor professors, and also foster practice. In this way, tutor professors are having a similar learning experience as their students. This online course is offered right now in the Virtual University, ITESM for all the tutor professors and this course belongs to the formal training program for new tutor professors who use technologies in their learning and teaching processes, specifically in the Virtual University.

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Student Expectations of Distance Educators: Instructor Roles in an Interactive Televised Classroom

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Abstract: An ethnography of graduate education students in interactive video-based classrooms provided the data for the exploration of student perceptions of the instructor's role in the technologically mediated learning environment that is set forth in this paper. Data suggest students assigned new responsibilities to the instructor and expected the instructor to bridge the distance gap between the classrooms, clarify new rules for classroom behavior, and maintain a focus on course content despite of the instructor's added technology related duties.

Introduction

Traditionally the classroom has been the teacher's domain (Barr & Dreeben, 1983). Students came to the teacher's classroom, took grades home that the teacher gave, and studied what the teacher said to study (Jackson, 1968). The teacher was in place to control social interaction (Borman, 1978; Shultz & Florio, 1979), to direct classroom organization (Dickinson, 1985; Shultz, Florio, & Erickson, 1982), and to guide learning activities. The teacher was the authority that held power in the classroom (hooks, 1994). In most classrooms this is still true today. Students still look to the instructor for guidance in the classroom, accept his/her evaluation of their performance, and expect him/her to carry a level of expertise in the subject matter that far exceeds their own.

However, there is also a longstanding relationship of trust between teachers and students. They "understand each other's behavior as directed to the best interests of what they are trying to do together and how they can hold each other accountable for any breach of the formulated consensus" (McDermott, 1977, p. 199). The form of trust that McDermott (1977) refers to is dependent upon interaction between the learner and the instructor and requires effort on the part of both to maintain it (McDermott & Church, 1976).

Distance education literature establishes the importance of creating classroom environments that provide the connectedness that instructors and learners need in the absence of face-to-face interaction to maintain their trust relationship (Boone, 1996; Garland & Loranger, 1996; Grasha, 1996). In the distance environment, however, more effort is required on the part of the students and instructors to maintain the traditional trust relationship, as well as to accomplish other traditional classroom responsibilities (Moore & Kearsley, 1996).

Our recently completed ethnographic research of interactive video-based classrooms suggests that before students entered their distance learning environment for the first time they were not prepared for the different roles that either they or the instructor would encounter. Their expectations were rooted in their traditional ideas that the physical presence of the instructor would allow that instructor to lead, guide, direct, teach, moderate, and have a particular awareness of students as individuals. When the technological mediation of the classroom interrupted the expected roles and behavioral patterns for classroom participants, students subliminally assigned new roles and expectations to their instructors and felt uncertainty about their own role. The data suggest that the inclination of students was to place the responsibility for the success of the added classroom elements on the instructor.

In this paper we will consider what students said about their expectations of the instructor and how those expectations influenced students' adaptation to their new classroom environment. An examination of student expectations provides insight that can inform distance educators who are in the planning phase about learner needs, can increase veteran distance instructors' sensitivity to students who are new to the environment, and can prepare new distance educators for scenarios they may encounter when they begin their distance teaching experiences.

The Study

The data that served as the basis for this paper was gathered during a one-year ethnographic case study of 13 graduate education classes that took place in an interactive video-based classroom that was officially named the Interactive Distance Learning Studio (IDLS) (Clevenger-Schmertzing, 2000). Students participated in class simultaneously from two different locations. Courses included in the study varied significantly in teaching style, course objectives, course content and student responses. Traditional ethnographic and qualitative research methods facilitated data gathering and analysis (Agar 1996; Maxwell 1996). Data gathering involved more than 400 hours of participant observations in classrooms, formal interviews and informal conversations with students and faculty, weekly e-mail correspondence, open-ended surveys, focus group interviews, and video of all classes. Thematic coding, frequency counts, and frequent debriefings between ethnographers L. and R. Schmertzing contributed to interpretation and ongoing analysis of the data (Spradley & Mann 1975). Throughout the ethnography hundreds of students expressed ideas, concerns, and thoughts on their distance learning experiences. Comments included in this paper are representative of themes that surfaced repeatedly in conversations, interviews, and survey data.

The Students' Voices

During the course of our study, students often voiced concerns that related to style of instruction, content of the course, class management, and learning style preferences. A major them that emerged from these discussions related to the individuality of instructors and the significant role they played in facilitating positive experiences in both traditional and distance classrooms. A student at the remote site said, "I think the technology works. I think it is a good method. I think it depends so much on the instructor" (RFt M FG 0i0.87). Another student, a host site student, said something very similar, "If [my instructor] had been someone else who couldn't do that [keep class discussion going across sites], it [class] would be a flop, I mean, the instructor is the key point in there (HFt F I v05.1251). Students were clear that, "The teacher is the most important thing. If the teacher is prepared and excited and cares, [...] then you are getting what you need to get" (HFt M I s11.8.1694).

Students depended a great deal on their instructor to make their distance learning class a success, as they would in a traditional classroom. The difference, however, was that as students tried to understand the new technologically mediated environment they also developed new needs and consequently had new expectations of the instructor. Our data suggest that the inclination of students was to place the responsibility for the success of the added classroom elements on the instructor.

As students adapted to their distance-learning environment, they made assumptions that the instructor would guide them through the uncomfortable spaces in their distance education experience. They expected the instructor to provide guidelines for adjusting to that experience. Many students assumed that the instructors would offer new rules for classroom behavior, that they would build a bridge that eliminated the distance between the two sites, and that they would have the ability to maintain a focus on content rather than on technology. The way the instructor handled these matters alongside his/her traditional classroom responsibilities had significant impact on the ways in which students adapted to the environment and changed the way they interpreted their own role in the classroom.

On Providing Rules

As a result of the absence of the instructor at one site and the breakdown in the rule system associated with traditional classrooms, researchers witnessed adult students reverting to immature classroom behaviors similar to those that one might expect to find in grade school. One student said it was because, "the feeling of someone being

there of authority [was missing]" (RFt F I s10.4.153). Some adult graduate students actually admitted the need for instructors to control the class and to remind them of the rules. Marybeth was one such student.

> Like don't talk when someone else is talking. You have to revert back to the first and second grades because we act that way with the [instructor at the other site]. I just think a lot of people don't realize that when the instructor is at the other site you think that they don't hear you or see you. So, I think that a lot of people just need to be aware of that. If you [the instructor] have to tell them or write it up on the board, I think you need to do that. (RFt F I s10.4.1051)

Students feelings of personal disconnectedness lead them to forget that they were visually and audibly linked to people at another site and consequently to behave inappropriately. Marybeth knew the behavior was inappropriate and felt that it happened because students had not come to a clear understanding of what was going on with the technology in the classroom. Her inclination was to expect the instructor to do what was necessary to get the situation under control.

Some graduate students wanted the instructor to propose other types of rules. Maylee felt it was the responsibility of the instructor to force the student's use of the technology.

> For some people it would take a little longer, but I think once you [the instructor] put your foot down and say, "Okay, let's go back to elementary school here. These are the rules. And to be a part of this class, this is what I need you to do to make it work." So, yes, there it is, "I need your participation [beyond] your comments or your working in this group. I need your participation in ringing this bell because those people over there are a part of this group, as well. So I need your participation, to help me as a professor make them feel like they are really a part of this group, because that's important to me as a professor. Those people over there need to feel just as important and that they are as much a part of this group as you are." (HP F I p4.28.1050)

Maylee had classes in the distance classroom every semester during the course of this research and her suggestion is actually based on a clearer understanding than most students had of the importance of connecting across campuses and what it took to accomplish that. For instance it meant using microphone controls to participate in class and Maylee firmly believed students needed to do it whether they wanted to or not. She also believed it was the instructor's responsibility to make that happen.

In the traditional graduate classroom it is not the norm to verbalize the traditionally unwritten classroom rules that address social structure and classroom interaction. However, knowing the rules of engagement in an environment like distance learning classrooms has been shown to enhance learners' use of the technology and, in turn, improve interactions between students in the classroom (Herrington & Rehn, 1993; Martin & Bramble, 1996; McCabe, 1998). The point remains that many students want to rely on the instructor to not only make the rules, but also to make other students follow the rules.

On Bridging the Gap

In addition to the uncertainty students experienced in relation to the unwritten rules of the classroom and how the instructor handled those rules, students also spoke of uncertainty related to bridging the distance across sites. In general, students did not initially take on the burden of connecting the two sites themselves, rather they expected the instructor to make the connection. "Somehow that instructor is going to have to pull both groups together" (RFt F I v811.1694).

In the classroom where everyone shares the same physical space, classroom participants learn to read body language (Barr & Dreeben, 1983; Mehan, 1980). Instructors and students alike fuel their understanding of situations and each other, not just with what is said, but to a great extent through issues of immediacy; things like behaviors, gestures, and subtleties of space and time that signal connection (Comstock, Rowell, & Bowers, 1995; Shultz et al., 1982). This physical proximity adds a dimension to the way students understand their instructors that is difficult, but not impossible to achieve in the distance environment.

Minnie, a remote student noticed her instructor's body language and how it functioned as a communication tool.

> I think that she [the instructor] encourages us. I just think that she has open body language and she's got a way of communicating. I don't know if she has practiced this because I could see where it would be real easy for a professor to focus in only on the class that she is in and kind of ignore the people that are in the other area that are the distant learners. And, I think that she has been able to bridge that, I've been real impressed. (RFt F I v104.491)

For Minnie, the instructor's overall demeanor, openness, and the apparent ease with which she traversed the separate sites through the technology allowed Minnie to feel connected to the instructor. Students looked to the instructor to help them understand what was going on in the classroom and how to deal with being separated. The modeled behavior of the instructor influenced the way the student herself approached the distance between the sites (Ben-Peretz & Halkes, 1987; Comeaux, 1995).

Even when students thought the instructor was doing a good job, they often had suggestions for how she could do better. Molly shared one of her suggestions with me.

> I think that she does a good job with what she is doing. The only suggestion I think I would do, is to call on people that are being quiet, and just get them started saying anything, even if it is one sentence. That would bring those people in. It would help those people to see that they are not being ignored. That, we know they are there. And I think it would be better if some of the people who speak a lot were not necessarily called on because they want to speak. (HFt F I v111.737)

Essentially, Molly clarified her understanding of some of the instructor's role by adding the expectation that the instructor should know and watch out for the students who may hide behind the technology and not get engaged in the class. Madge stated her support for the same idea. "I think the professors are going to have to be very well aware of coming back and forth between the two [sites] and not letting somebody get left out there, like the forgotten child and that could easily happen. For if they [the classes] get too big you could just sit there and well, you can sit quietly in the corner and do your reading" (HFt F I v14.1693).

Once again, the student placed the responsibility on the instructor to draw students into the class. It is worth noting that students might say things that sound similar to things that they say about the instructor's responsibilities in a traditional class, like "call on people that are being quiet," but in this research data show that the situation is magnified and the statements are made with more urgency. Not all students in the environment placed so much responsibility on the instructor. Many did however, especially students who were in their first course in the distance environment and/or early in the courses for their graduate programs.

The traditional expectation that the instructor be attune to most of what is happening in the classroom does not seem unreasonable to students, yet it is something that appeared to be quite difficult to achieve. I asked Mel about it.

> Intrvr: Did you feel like she was aware of the atmosphere in your classroom?
>
> Mel: Uh uh, no. And I don't think that was any fault of her own, I think that we were just so far away from her that she didn't realize what was going on in that room. She didn't realize, you know, that some people never did any of the work, they just asked to copy it. You know, I don't think, she had no way of knowing it. There was just no way. (RFt F I v8)

Though Mel might have felt that the instructor needed to be more aware of things that were going on in the remote site, she did not blame the instructor for not knowing. She excused the instructor because of the distance classroom. Heimlich and Norland (1994) report that adult students inherently want to cling to the traditional ways of respecting the teacher. This may partially explain why many students in the IDLS gave the instructor latitude and blamed the distance environment when things seemed difficult for the instructor. "They are trying to watch two classrooms and that's kind of hard" (RFt F I s10.4.60.a). A host student had the same type feelings, "Well, I'd say I am in here, and if she's here teaching us, you could read, or she could read your facial expression. But if she's in the TV, it's hard, oh she cannot read what your facial expression is" (HP F I p201.317). Students varied significantly in the degree of tolerance and understanding they showed for the instructor as the instructor attempted to adjust to the technology in the IDLS.

On Focus

The preconceptions with which adult students entered the classroom were based, in part, on the pedagogical experiences of their past which generate the image that the instructor is the embodiment of what they are to learn (Heimlich & Norland, 1994). The instructor then becomes the visual focal point upon which the student centers his/her thoughts on the course content. In the IDLS, when the attention of instructors was divided between their traditional responsibilities and the technology, students like Melody expressed concern, not simply because of the time it took, but also because it disrupted their thinking and learning processes.

> [The instructor] is there and she is worrying about the cameras and getting the tape recorders going and getting this going and getting that going. She is busy focusing on setting up the classroom rather than on kind of interacting with us. At the time when she would walk in and put her notebook up and say,

> whatever, you know, that time of interacting. Instead she is putting on her microphone and adjusting the cameras and making sure they are all up and running. I think that is a big difference. (RFt F I v14.1393)

Melody sensed that the technological demands of the IDLS kept her instructor from "interacting" with students at a time that was traditionally time "for interactions with us."

The perception that the technology required a piece of the instructor's attention, which students were not accustomed to sharing, varied among students. Malcomb, one of the military men who was a student in the IDLS at the time, had an interesting way of expressing the complications that instructors had to handle to keep class running smoothly.

> A professor can't do it all by himself. As a pilot for 24 years, I flew fighter type aircraft, F-4's, A-10's and that sort of thing, but I spent some years as an instructor pilot as well. [...] I can remember writing, scripting and doing everything for a formation video, [...] and I'm sitting there, and I'm flying the airplane. [...] and I'm coming in on the re-join, I'm talking about the procedures, and then I'll click another button so that I could talk to the guy who is sitting next to me with the camera and direct his view, and the point is, I guess what I'm getting at is, you in fact, you can do all that but you can't do it the first time. (HP M I v12.20.827)

This student put the instructor task into perspective by equating it to his own experience of trying to teach, direct, and manipulate technology all at the same time. He, like many of his peers, was empathetic in his recognition of the complexity that had been added to the instructor's job.

The impressions other students had of the same complexity caused more personal complications for them in relation to their focus in class. Misty was significantly bothered by the instructor attending to technological glitches.

> The instructor has got enough to do, they've got to teach a class and that requires full attention, especially at this level. It is not something that you can just do. [...] If the instructor is even the slightest bit distracted with something technical going on, both sides, the one where the instructor is and the other side starts to resent the fact that they are in a distance learning lab and they have to deal with this technology garbage because we don't really like it to begin with and if any little thing happens that demands our instructor's time and attention, we get, I get, very resentful of that. And it makes you remember that you are in a distance learning lab. You might have forgotten for a second and lost yourself in the moment of the class and you're engaged in the subject matter and you're forgetting that you're watching a monitor but then, all of a sudden, when the instructor is fumbling with microphones or needs to deal with something that a facilitator could handle, himself or herself, it's a problem. (RFt F I v107.835)

Misty used the instructor as a guide to keep her own attention focused. When the technology demanded the time and attention of the instructor, Misty had difficulty staying focused. She also raised another issue that went beyond her difficulty with focusing on course content. She got "resentful" of the technology and the methods used in the IDLS. Her resentment disrupted her attempt to adapt to the classroom and actually jarred her thinking, causing her to think about the "technology garbage" that was interfering with her learning experience.

Although the instructor may not have held the same physical position in the IDLS that she did in the traditional classroom, she still was to be the focal point for many students. In the traditional classroom when focus is interrupted, students may get distracted or even irritated, but the problem that caused the interruption is usually removed and does not recur. In the IDLS, not only can the interruption be recurring, but the thing that students sensed was causing the problem, the technology itself, continues to be something that students need to feel comfortable with and positive toward in order to get the most out of their learning experience. The way students adapt to these interruptions is vital for their overall well-being in the IDLS.

Conclusion

The instructor in the IDLS had a different physical presence from an instructor in a traditional classroom setting. In the home site she was encumbered by technology and at the remote site she was on TV. Nevertheless she was still the focal point for many students. Moreover most students, following the pattern of traditional classroom culture where they expect the teacher to be responsible for resolving issues and controlling interaction, expected her to do the same in the distance classroom. Thus the instructor's role, in the distance classroom is complicated and compounded. On the one hand she must be aware and reflexive about the way technology is changing her performance and the way students perceive her. On the other hand she must take on the added burden of resolving not only those crisis issues that would occur in any classroom but also the additional ones related to establishing new classroom rules, bridging the distance between sites, and maintaining a content focus in spite of the technological mediation.

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Organizational Learning: the Venue for Institutional Change with Online Technologies

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Abstract: As educational institutions envelop technologies to include online course components from the distributed model to complete anywhere/anytime online programs, faculty and student mental models of teaching/learning must change. The change can be slow as the face-to-face model of teaching/learning evolves into with the new model. How can institutional professional developments programs provide the new teaching model for faculty with no experience using online technologies? Faculty need to know both how these new technologies work and how they might implement these technologies to facilitate learning. How does the institution ensure that its professional development programs are not individually targeted but rather grow individual learning into organizational learning?

Daniel Kim, of the Senge Learning Organization, has provided a model for linking individual change to organization change. This paper will present the rationale and the model to effectively link individual learning to organizational learning. In addition, two case studies will be provided during the face to face presentation.

Introduction

In a fashion likened to the internal combustion engine, information technologies are "shaping the transformation of higher education" (Matthews 1998). Higher education seems to be rallying some of its forces to respond to this change, yet in many instances, the response is merely surface response to just the technology and the infrastructure. However, the Peter Senge learning organization philosophy is catching on at least in theory in many campus strategic planning sessions offering the hopes of facilitating change from the top down and the bottom up. Organizational learning, according to Zederayko and Ward (1999), takes deliberate and ongoing effort.

Institutional strategic planning may help produce new institutional mental models, yet changing the mental models in regard to teaching and learning will not be easy, for in the traditional model of education, "learning" has not been the primary mission of universities. According to O'Banion ("A Learning College"). "Ask any educators what the purpose or mission of a university is and they respond: research, teaching, and service." "No one ever . . . asked me for information regarding my teaching ability, much less data about the kind or quality of learning I had helped my students achieve" ("A Learning College"). Stigler and Hiebert (1997) addressed teaching itself in this new model and stated that the "biggest long-term problem is not how we teach but that we have no way of getting better. We have no mechanism built into the teaching profession that allows us to improve gradually over time."

In addition to lack of mechanism for improvement, Cravener (1998) reported that

> A proposal to a professional educator that he or she needs to adopt new media for teaching is a potential threat: the implicit assumption is that the old way was somehow inadequate, insufficient, or not optimal. Feeling even marginally incompetent is anxiety-provoking; people continually defend themselves against the experience. These affective factors often raise active resistance to distance

learning paradigms and the faculty development programs associated with them, predisposing faculty to avoid or reject learning to use educational technologies.

The lack of time and incentives for professional learning are significant impediments for developing a learning organization. It is difficult for teachers to be members of learning communities or learning organizations without time for regular reflection, research, collaboration, and innovation. Dr. Terry O'Banion contended that unless faculty are trained in non-traditional teaching styles, environments, and pedagogies and unless learning institutions become learning organizations, information technologies "have great potential to expand really bad teaching and really bad educational models. . . . " ("A Learning College," 1998).

What appears evident then is that untrained and unsupported faculty could be considered the weakest link in new teaching and learning environments, i.e, in potentially successful online learning programs. Strengthening that link requires well-developed professional development programs with appropriate faculty incentives for moving into the new mental model of teaching and learning.

If teachers need to be lifelong learners, if our teaching focus needs to shift to a learning focus, and if learning institutions need to become learning organizations, education faces many challenges. Perhaps the first challenge is to disconfirm the "fragmented learning styles of individuals and spread the learning throughout the organization" (Kim 1993). This educational paradigm shift for learners inherently includes how the organization that facilitates the learning, i.e., the learning institution, shifts its practices and policies regarding how it constructs, encourages, and applies its own learning.

Learning Organization

How do learning institutions become learning organizations – or communities with an enhanced capacity to learn, adapt, and change? Senge (1990) presented a model for the learning organization and included five new "component technologies" that "provide a vital dimension in building organizations that can truly 'learn,' . . . and enhance their capacity to realize their highest aspirations": systems thinking, personal mastery, mental models, building shared vision, and team learning. The institution of higher learning that facilitates learning must itself become a learning institution [organization]. In a "learning college," learning is the mission, the purpose, and the core value for administration, faculty, staff, as well as students.

Daniel H. Kim (1993) from the Centre for Organizational Learning at MIT Sloan School of Management presented the OADI-IMM model for individual learning that included: Observe, Assess, Design, Implement --- a process that would develop an Individual Mental Model (IMM). Senge (1990) described mental models as deeply held internal images of how the world works and stated that our individual mental models have a powerful influence on what we do because they also affect what we see. It would seem that if the new technologies draw teaching/learning into the constructivist mode, then faculty steeped in the traditional teaching model need to create a new individual mental model of "learning space" and "learning process." The movement from sage-on-the-stage to guide-on-the-side needs to be observed (experienced) and assessed (considered for incorporation into the individual's mental model). The observation and assessment of Information Technology's impact on learning must come first in order to shape personal mastery and a new mental model.

Hierarchical constraints run contrary to shared mental models and organizational learning. O'Banion articulated the Fordist hierarchical model of promotion in a university stating the highest reward is the distinguished research chair with promotion through professional ranks based on juried articles and books published. The notorious tenure track system of job security and status that rewards research and publication and does not recognize or reward the development of new teaching styles prevents many faculty from aligning themselves with innovative teaching/learning strategies. Coupled with the research/publication requirement is

the need for community service and campus committee obligations that further that tenure process.[1] Once tenured faculty have become part of the guard, they have vested interest in the notion that research, scholarship, and publication are the gatekeepers to the attainment of that academic security blanket. The system replicates itself and the loop closes to the recognition of innovative teaching/learning environments. Gatekeeping controls access with the word *control* fundamental here.

Higher education is synonymous with hierarchy: president, vice presidents, deans, division chairs, department chairs, faculty (full professor, assistant professor, associate professor, instructor, adjunct, teaching assistant). We have a classical system of management with the attendant values of continuity, certainty, and control. Fitzgerald ("Living on the Edge") stated that education "remains mesmerized by the Newtonian promise of certainty that has taught us to do nothing until we are absolutely certain we know what will happen in detail if we do anything." Nobody likes to be in error, least of all people in positions of influence who "for their entire careers have claimed to know it all, to be 'learned' rather than a learner" (Fitzgerald, "Mindful Chaos").

Kim's OADI-IMM model that links individual learning to organization learning echoes Fitzgerald's theory. Organizations learn through individual members and thus are directly or indirectly affected by individual learning. The cycles of individual learning affect learning at organizational level because individual mental models influence the organization's shared mental model. Organizations can learn only through their members but are not dependent upon any specific members. This understanding led Kim to link individual learning to organizational learning by moving OADI – IMM to OADI-SMM (shared mental model). Why put so much attention on mental models? "Because the mental models in individuals' heads are where a vast majority of an organization's knowledge (both know-how and know-why) lies" (Kim 1993).

Into his organizational learning model, Kim incorporated the Argyris and Schon concept of double loop learning which involves individual mental models challenging deep-rooted assumptions and norms of an organization to affect organization action. Kim indirectly incorporated Senge's five disciplines: a shared vision, personal mastery, team building, mental models, and systems thinking. The facilitation of personal mastery shapes an individual's mental model that with team building becomes a shared mental model. If individual mental models are created, and if those individual personal mastery skills in the new arenas are honed, then self-organizing systems evolve that shape the shared vision and lead to systems thinking.

Three levels or orientations of learning are identified: individual, team or group, and organizational. A learning organization's vision, strategy, leaders, values, structures, systems, processes, and practices all work to foster people's learning and development and to accelerate systems-level learning. Organizational learning occurs in increments or as transformation with skill development focus on individuals and/or groups (Gephart, et al., 1996) In learning organizations, leaders and managers at all levels provide critical support to the learning and development of individuals and teams by

- modeling learning behavior
- providing systems that facilitate learning
- encouraging people to contribute new ideas
- ensuring the dissemination of knowledge and learning
- freeing resources in order to signal the organization's commitment to learning
- sharing leadership

Leaders and managers who lead with knowledge of the learning organization and chaos and complexity theory recognize that they have considerable power to create an effective learning environment by providing the systems that encourage learning. They enable the development of employees' knowledge, skills, and abilities through personal development plans and cross training. Learning organization managers encourage the exchange of ideas, creativity, and suggestions while leaving room for the making of mistakes.

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[1] A. W. Bates, Director of Distance Education and Technology, Continuing Studies at the University of British Columbia, presented the June 199, 1999, keynote address at the First Annual WebCT-ULT conference in Vancouver, British Columbia, "The Impact of WebCT on the Design of Teaching in Higher Education."

A professional development plan must revolve around a gradual increase in faculty skill and confidence with online technologies and pedagogy while at the same time assist with the immediate implementation of these skills in traditional courses with subsequent implementation into online components. Empowering the faculty will empower the students and amount to no less than restructuring the university.

In order to transform individual mental models and subsequently the institutional mental model, the professional development plan needs to be grounded in the most powerful process in complexity theory: the micro level – the people relationship dimension. In 1978, James MacGregor Burns introduced the concepts of transactional and transformational leadership highlighting three characteristics of transformational leaders:

- Set high standards of conduct and become a role model gaining trust, respect, and confidence from others
- Articulate the future desired state and a plan to achieve it
- Question the status quo and continuously innovate, even at the peak of success; energize people to develop and achieve their full potential and performance (http://cls.binghamton.edu/mission.html)

Regine (as cited in Santosus, 1999) articulated similar leadership characteristics for success in a complex environment:

- Be accessible
- Respond immediately to others
- Acknowledge and value people's contributions at all levels
- Create opportunities for people
- Take time to build trusting relationships and to walk the talk

Kim (1993) defined individual learning as "increasing one's capacity to take effective action." The Kim OADI model relates to individual learning and stands for observe, assess, design, and implement. Kim turned to Argyris and Schon (1978) to understand how individual learning can affect organizational learning. "Organizational learning is not merely individual learning, yet organizations learn only through the experience and actions of individuals." Based on Argyris and Schon observations, Kim noted that an organization learns through its individual members and therefore is affected neither directly or indirectly by individual learning. Argyris and Schon argued that organizational learning takes place through "individual actors whose actions are based on a set of shared models." With this understanding, Kim added SMM (shared mental model) to the OADI model (OADI-SMM) linking individual learning to organizational learning and thus effecting the change in the organizational mental model that is required for organizational learning. Let's look at the OADI-SMM model as it applies to the strategic plan to embed online technologies into the traditional campus.

Observe	Faculty will participate in an online course that teaches about online technologies and pedagogy and promotes participant interaction on topics of online learning through the use of an electronic bulletin board and chat sessions.
Assess	Participants will assess a traditional class's adaptability to online environments. Participants will write the purpose of the class, the global objectives, and assess which online environments would work for the course. Participants will share assignments in the online bulletin board moving individual models closer to the shared model concept.
Design	After assessing a traditional class for adaptability to online technologies, participants will design one lesson as the lesson structure framework for the entire course. This lesson, created in a web editor and uploaded into the online bulletin board, will be shared with others.

Implement	The last lesson will ask participants to post a mail message to the online instructor detailing which environments they would like to build into their traditional course and determine a time when the instructor can visit their office to assist them with required technology. The lesson will include the assurance that the instructional design staff will assist with the first lessons in the computer lab and provide assistance with design and will be available for participation in the course's introductory hands-on lessons using the technologies.
Shared Mental Models	Instructional design staff will provide online and face-to-face group activities to promote the shared mental models. Individuals building confidence and competence with online technologies will self-organize and begin to share mental models.

According to Kim, as individuals learn, the individual mental models (IMM) affect learning at the organizational level and become shared mental models (SMM). Organizational learning is dependent on individuals improving their mental models, and emphasis is placed on mental models because the "mental models in individuals' heads are where a vast majority of an organization's knowledge lies." Kim's OADI-SMM model incorporates Argyris and Schon's concept of single and double-loop learning where double-loop learning involves challenging deep-rooted assumptions and norms of an organization.

Two case studies of the OADI-SMM model include the professional development program at a small four year liberal arts university in the Midwest and the other the model for online course management trainer certification through WebCT. Both models place participants into an online learning course (observe) that requests participants submit assignments that involve assessing and sharing of their learning and its application to online learning in a variety of forms (assess). In both models participants design an online learning lesson and share it with other participants in the online environment (design) while they are encouraged, nurtured, and supported in both an online and a face-to-face format as they grow in confidence and ability with their new mental models (implement). In both models, participants are then brought into a face-to-face environment where they share their new mental models and support and encourage each other in the continued development and implementation of this new model. Both models have been effective as reported in qualitative feedback via online surveys. A formal study has not occurred.

Conclusion

Traditional mental models of teaching and learning have existed for decades. Most educators tend to facilitate teaching and learning in the same model in which they learned, even if they may have found that teaching and learning to have been ineffective for them. Peter Senge's learning organization philosophy discusses changing mental models for new paradigms; Daniel Kim presents the model for linking individual mental models to institutional mental models. Higher education institutions would be enriched by consideration of the Kim OADI-SMM as the foundation for their professional development initiative.

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Summer Technology Institutes:
Overcoming Barriers to Technology Integration in Higher Education

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Abstract

As the century begins, the need for K-12 students to be technologically literate grows more urgent every day because of the rapid expansion of information. If the potential benefits of this information revolution are to be realized in schools, the teachers of today must be prepared to use modern technology as educational tools. Today's classrooms demand that beginning teachers possess the necessary skills to integrate technology into the curriculum. As the first step in the change process, the teacher educators needed to be retooled and retrained. In the summer of 2000, three Summer Technology Institutes for faculty at the University of the Incarnate Word were developed and implemented. The purpose of these institutes was to help faculty develop technology skills to aid in the improvement of their classroom teaching.

Need for Faculty Development

In 1996, President Clinton launched a national mission to make every person technologically literate by the 21st century. He recognized that technology can help expand opportunities for American children to improve their skills, maximize their potential, and ready them for the 21st century. As the century begins, the need for K-12 students to be technologically literate grows more urgent every day because of the rapid expansion of information. If the potential benefits of this information revolution are to be realized in schools, the teachers of today must be prepared to use modern technology as educational tools. Today's classrooms demand that beginning teachers possess the necessary skills to integrate technology into the curriculum (Marker and Ehman, 1989).

In recent years, there has been growing recognition that teacher preparation programs must prepare their preservice teachers to teach in tomorrow's classrooms. However, there is also recognition that while many teacher preparation programs provide some computer training for preservice education, many of the university faculty, both inside and outside of the School of Education, do not have the technology expertise needed to develop well-prepared technology-proficient teachers. The concerns about preservice teacher education and faculty development in technology is well documented in the research (Persky, 1990, Bruder, 1993, White, 1994). This daring challenge for universities requires a realistic evaluation of where teacher preparation programs are today, where they are headed, and how they intend to get there.

Hoadley, M.R., Engelking, J. L. & Bright, L.K. (1995) maintain that in order for teacher preparation programs to be successful, it must be recognized that faculty need training, support, and time for reflection to integrate technology into the curriculum. The Summer Technology Institutes, developed as part of faculty development at the University of the Incarnate Word, provided the teacher preparation faculty as well as other university faculty with the needed training, support, and time for reflection that was needed.

Vision

The vision of faculty involved in teacher preparation at the University of the Incarnate Word is to produce quality teachers who are well-versed in innovative instruction, skilled in technology and prepared to serve the multicultural and diverse student populations of South Texas. We believe that future teachers should learn with modern technologies integrated into the postsecondary curriculum by faculty who are

modeling technology-proficient instruction, particularly in courses where they acquire subject area expertise.

However in a realistic evaluation of the effectiveness of the technology component of the University of the Incarnate Word's teacher preparation program, most faculty are neither modeling the use of technology nor requiring students to use technology. The results of an Instructional Technology Needs Assessment survey of the UIW faculty in 1998 reveal that 51% of the faculty use technology in their instruction only once or twice a semester and 47% of the faculty require students to use computers only once or twice a semester. Most of the instruction in technology at UIW involves teaching about technology as a separate subject, not teaching with technology by integrating it into other coursework to provide a model for instructional use. The lack of modeling, a very powerful teaching strategy, creates major gaps in regards to technology of our future teachers.

In order to make the vision of our faculty in teacher preparation become a reality and to adequately train future teachers to use technology, we realized that technology must be integrated into all aspects of the teacher preparation program. Genuinely integrating technology into the preservice teacher preparation program at the University of the Incarnate Word would require system-wide change, initiative, and time.

As the first step in the change process, the teacher educators needed to be retooled and retrained. In the summer of 2000, three Summer Technology Institutes for faculty at the University of the Incarnate Word were developed and implemented. The purpose of these institutes was to help faculty develop technology skills to aid in the improvement of their classroom teaching. The content of the institutes included study of the instructional design process and the principles of graphic design, hands-on practice with multimedia presentation and web editing packages. Participants in the institutions learned to use digital imaging tools and worked with digital sound.

During the Institute, faculty developed a project relevant to courses that they taught. Some faculty developed PowerPoint presentations while other faculty, at higher levels of technology proficiency, developed web pages for their courses. At the end of the two-week session, each faculty had their projects placed on the STI Web site for others to view. Upon completion of the training, each faculty received a stipend of $1000 as well as gifts of hardware and software.

In addition, all fulltime university faculty who participated in the Summer Technology Institute program were eligible to submit a proposal to become a Technology Fellow during the next school year. This unique program enables three faculty members to become technology resources for other faculty at the university. The proposals submitted by the faculty outlined a project that integrates technology into their classroom instruction. The Technology Fellows will receive one course release time for the fall or spring semester to work on the project. The fellows will also be asked to do two presentations of their final project to the university community.

As is true with many institutions, University of the Incarnate Word is embracing new technologies to fulfill preservice teacher's changing needs. The Technology Summer Institute project is an example of professional development in technological literacy that focuses on individual faculty needs and levels of expertise. Clearly, a major priority for the university is to impacted teaching and learning in the university classroom through the Summer Technology Institutes.

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A Study of Faculty Perceptions to the Integration of Systems Thinking in the Teacher Preparation Program at Northern Arizona University

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Abstract: This paper is a report on a study done at the Center for Excellence in Education at Northern Arizona University. In 1984, the Center was created on a concept of moving away from the typical hierarchical structure of a college of education toward a matrix. The matrix was designed to help create a community of people in a diverse organization and move away from the "turf" concept of departmentalization. A concept that was to be verbalized by Peter Senge (1990) in his book on learning organizations. By the fall of 2000, the Center has deteriorated back to a hierarchical, departmentalized college of education. Senge (1990) identifies 7 organizational learning disabilities that are typical in organizations that are not learning organizations. This study was a survey of the faculty of the Center to help gain a better understanding of where we are in terms of suffering from these 7 learning disabilities.

Introduction

We, especially those who are the product of the Western logical scientific mind-set, are taught to break complexity and complicated subjects into manageable tasks. But in doing so we pay a hidden, enormous price. We lose our intrinsic sense of connection to a larger whole and can no longer see the consequences of our actions. When we try to reassemble the fragments to see the "big picture" it is similar to trying to reassemble the fragments of a broken mirror in order to see our true reflection. What all to often happens is that we develop mental models of the world that it is composed of separate, unrelated forces. In 1990, Peter M. Senge published *The Fifth Discipline: The Art and Practice of The Learning Organization.* Senge states the tools and ideas presented in the book are for the purpose of destroying this illusion that the world is created of separate, unrelated forces. He contends that when an organization gives up this illusion that what can result is a learning organization where the people of the organization continually expand their capacity to create the results they truly desire. He goes on to state that it is no accident that most organizations learn poorly. "The way they are designed and managed, the way peoples' jobs are defined, and, most importantly, the way we have been taught to think and interact (not only in organizations but more broadly) create fundamental learning disabilities," (Senge, 1990, p. 18). Within an organization, these disabilities operate despite our best efforts and what learning that does occur within an organization takes place despite these learning disabilities. The reason is that they permeate all organizations to some degree. Senge (1990) identifies seven organizational learning disabilities.

The first learning disability is, "I Am My Position." As members of an organization we are conditioned to be loyal to our jobs, so much so that we confuse them with our own identities. Most people see themselves within a "system" over which they have little or no control. Thusly, they tend to concentrate their "work energies" within self-defined limited boundaries of their position. When asked what they do for a living, they will

respond by giving the task they perform every day, not the purpose of the greater enterprise in which they take part.

The second learning disability Senge calls, "The Enemy is Out There." In all human beings, there is this self protection mechanism that entices us to find someone or something outside ourselves to blame when things go wrong. Within an organization this "Thou shalt always find an external agent to blame," is often raised to a commandment level. This syndrome is a by-product of "I Am My Position." When we focus only on our position, we do not see how our own actions extend beyond the boundary of that position. When those actions have consequences that come back to hurt us, we misperceive these new problems as externally caused.

The third organizational learning disability is "The Illusion of Taking Charge." Leaders within an organization frequently proclaim the need to take charge in facing difficult problems. They proclaim it is time to stop waiting for someone else to do something, they then roll out the latest program that they have designed to face up to difficult issues and solve the problems. All to often, this "proactiveness" is reactiveness in disguise. These "programs" are in reality a more aggressive way of fighting the "enemy out there." They are a form of reacting – regardless of what it is called. "True proactiveness comes from seeing how we contribute to our own problems. It is a product of our way of thinking, not our emotional state" (Senge, 1990, p. 21).

The next organizational learning disability is called, "The Fixation On Events." We are conditioned to see life as a series of events, and we believe that for every event there is one obvious cause. Focusing on events leads to what is called "event" explanations. Such explanations may be true as far as they go, but the reality of the situation is that they distract us from seeing the long-term patterns of change that lie behind the events and from understanding the causes of those patterns. Senge (1990) states that the irony is that in today's society the primary threat to our survival, both as organizations and as societies, come not from sudden events but from slow, gradual process like the arms race, environmental decay and the erosion of a society's public school system.

The fifth learning disability is "The Parable of the Boiled Frog." If you place a frog in room temperature water and gradually begin to heat the water the frog will do nothing and will eventually sit there and boil. Why? Because the frog's internal apparatus for sensing threats to survival is geared to sudden changes in his environment, not slow, gradual changes. We as human beings have the same problem. We will not avoid the same fate of the frog until we learn to slow down and see the gradual processes that often pose the greatest threats. Learning to see slow, gradual processes requires slowing down our frenetic pace and paying attention to the subtle as well as the dramatic.

The sixth learning disability is "The Delusion of Learning from Experience." When our actions have consequences beyond our learning horizon, it becomes impossible to learn from direct experience. Herein lies the core learning dilemma that confronts organizations. We learn best from experience but we never directly experience the consequences of many of out most important decisions. Cycles are particularly hard to learn from, especially if the cycles last for several years. Traditionally, organizations attempt to deal with this problem by breaking the decision making process up into components. They institute functional hierarchies that are easier for people to manage. What nearly always happens is that the hierarchies grow into fiefdoms which eventually cut off contact between functions and separate the decision makers even farther from the full impacts of their decisions.

This brings us to the last organizational learning disability identified by Senge (1990), "The Myth of the Management Team." Standing forward to do battle with the dilemmas and disabilities of an organization is the management or administrative team. Together, they are supposed to sort out the complex cross-functional issues that are critical to the organization. All to often these teams tend to spend their time fighting for turf, avoiding anything that will make them look bad personally, and pretending that everyone is behind the team's collective strategy – maintaining the appearance of a cohesive team. If there is disagreement, its usually expressed in a manner that lays blame, polarizes opinion, and fails to reveal the underlying differences in assumptions and experience in a way that the team as a whole could learn. Historically, most management or

administrative teams function quite well with routine issues but break down under pressure. Only to be replaced by another team

Brief History of The Center for Excellence in Education

In January of 1984, the then Governor of Arizona, Bruce Babbitt, recommended that the Arizona Board of Regents and the state Board of Education begin to explore alternatives to colleges of education. Responding to that pressure, in the fall of 1984 the traditional College of Education at Northern Arizona University was disbanded and the Center for Excellence in Education was created. The concepts of departments were done away with and a non-hierarchical matrix was put into place. A Director and Associate Director replaced the traditional Dean and Associate Dean. This was far more that just a name change. Within the matrix concept, the directors became part of a team that over saw the day-to-day operations of the Center. The other members of this team were the Director of Research, Director of Educational Services, Director of School Services and Director of Professional Programs. Each Director handled specific tasks within the Center, but were responsive to the Center as a whole. The faculty then became a single unit that had direct contact with all of the Directors and their expertise was then channeled to where it was the most effective. There was open communication between all the faculty and the faculty had direct access to all the directors. This allowed a creative energy to appear that lead to some of the most innovative programs that had ever been developed in Arizona.

The diversity of programs created a problem of coordination. To assist in the coordination of these programs and to help open channels of communication between programs, in 1987 the matrix was adapted to include the concept of areas with area chairs. Each faculty member was assigned to an area, but both the area chair and the faculty through negotiations was still free to apply their expertise where they felt it was needed most. Most important was that the budget was not under the direction of the area chair. Budget allocations were made public and the distribution of those funds was determined by input from the team of directors, area chairs, and faculty committees. The primary function of the area chairs was to help coordinate the many different programs.

In 1997, a new Director was hired by the Center. This director immediately began to disassemble the concept of the matrix and reinstate the hierarchical university concept of a college. The name of the office was changed from Director back to Dean. All budgetary matters were placed the direct control of the Dean. All Associate Directors were removed and Associate Deans put in their place. By the Spring of 2000, departmentalization was reestablished with department chairs. Faculty governance was isolated to trivial matters and faculty had no input on budget items. By the Fall of 2000, the Center for Excellence in Education was for all practical purposes a typical college of education.

Faculty who had experienced the concept of the matrix and shared governance appear to be very discouraged. Airs of negativism and dissatisfactions seem to be growing within the faculty. Disputes and "turf" battles appear where little or no conflict had occurred before. To quote a senior faculty, "I was astonished when I was chewed out by a department chair for 'stealing her faculty' when I asked another faculty member from her department if they would be interested in teaching a course in our department. This never occurred before."

The Study

Several faculty members were very aware of the work of Peter Senge (1990, 1994, 1999, 2000). The Educational Technology Faculty had received a grant to conduct professional development with a local school district based upon systems thinking and the *Fifth Discipline* (Senge, 1990). Also, through a National Science Foundation grant, the Northern Arizona Leadership Institute was created within the Center. This Institute began working with the superintendents of several Phoenix area school districts. Much of this work had as its foundation the five disciplines. Due to this understanding, combined with the changes that had occurred within the Center for Excellence in Education it was decided to see how the faculty related to the seven organizational learning disabilities identified by Senge (1990). Questions were designed based upon the seven

disabilities. The questions were placed on the web so that faculty and staff could take the survey anonymously from their office or home computers.

Findings

Within the Center for Excellence there are 93 full time and part time faculty members. The number that responded to the survey was 24 which represents a 24% response rate.

The first learning disability is, "I Am My Position." When members of an organization are asked what they do for a living, they will respond by giving the task they perform every day, not the purpose of the greater enterprise in which they take part. The people of the Center were asked to classify themselves as an (assistant, associate, or full) professor, or a staff member, or an administrator. This would be considered as an indicator of "I Am My Position." They were also given the choice to classify themselves as a member of a Department or as part of the Center for Excellence in Education. This would be indicators that they viewed themselves more in terms of the greater enterprise.

Viewed themselves as professor, staff or administrator	92%
Viewed themselves as a member of a department or CEE	18%

Another indicator of the "I Am My Position." is that the individuals see themselves within a "system" over which they have little or no control. The survey gave them a series of tasks that most are involved in and asked them to rate the tasks as: 1. Any effort in that area would be useless, 2. I have control in a few areas so I work in those areas and don't bother with the rest, 3. In that area I can make changes but within the Center what I do has little or no effect, 4. Somewhere between 3 and 5, and 5. I can make changes and those changes can result in changes within the Center. Below are the results:

Modifications in a syllabus	1: 0%	2: 0%	3: 17%	4: 25%	5: 58%
Modifications in programs	1: 8%	2: 25%	3: 13%	4: 42%	5: 12%
Creating changes in structure of the Center	1: 33%	2: 33%	3: 8%	4: 25%	5: 0%
Creating changes in operations of the Center	1: 38%	2: 29%	3: 17%	4: 17%	5: 0%
Creating changes in their area	1: 0%	2: 41%	3: 13%	4: 33%	5: 13%
Creating changes through committee work	1: 17%	2: 29%	3: 29%	4: 17%	5: 8%
Creating changes how courses are taught	1: 4%	2: 8%	3: 8%	4: 29%	5: 50%
Creating changes in what courses are taught	1: 13%	2: 20%	3: 25%	4: 21%	5: 21%
Having input on administrative changes	1: 57%	2: 22%	3: 4%	4: 13%	5: 4%
Helping facilitate the Center mission	1: 13%	2: 29%	3: 13%	4: 20%	5: 25%
Providing quality learning environments	1: 4%	2: 4%	3: 25%	4: 25%	5: 42%

The second learning disability is "The Enemy is Out There." When people focus only on their position, we do not see how our own actions extend beyond the boundary of that position and when those actions have consequences that come back to hurt us, we misperceive these new problems as externally caused. What is not perceived is that "out there" and "in here" are part of a single system. The faculty was as to use the following rubric to react to some issues that face us: 1: I am not sure what the cause is, but I feel that change can happen, 2. There is a cause, I just don't know how to create change, 3. I know the cause and if I can just work harder and smarter I can create change, 4. The primary cause is the leadership of the Center, 5. The primary cause is outside the Center caused by pressure from the university, state and/or national political structures. Below are the results:

Most teacher prep programs have little effect	1: 29%	2: 8%	3: 41%	4: 8%	5: 13%
Morale in the Center is low	1: 8%	2: 4%	3: 16%	4: 66%	5: 4%
State tests keep students from being teachers	1: 29%	2: 0%	3: 33%	4: 0%	5: 38%
Successful faculty in the Center are leaving	1: 21%	2: 8%	3: 16%	4: 50%	5: 4%

People in the Center feel powerless	1: 21%	2: 13%	3: 13%	4: 50%	5: 4%
People of the Center do not express concerns	1: 26%	2: 9%	3: 13%	4: 52%	5: 0%

The third organizational learning disability is "The Illusion of Taking Charge." All to often, this "proactiveness" is reactiveness in disguise. True proactiveness is a product of our way of thinking and comes from seeing how we contribute to our own problems. In the survey the participants were given some possible changes that concerned faculty satisfaction. They were asked to rate the change using the following rubric: 1: I believe that this action is the solution, 2. This action maybe part of the solution, but other actions will be necessary, 3. I might prefer or not prefer this action, but it will create no lasting change until I change, 4. I believe that this action will have no effect on the problem or make the situation worse, 5. I have no thoughts on this action. Below are the results:

Remove the Center's Administrative Team	1: 17%	2: 49%	3: 4%	4: 17%	5: 13%
Remove State's Education officials	1: 4%	2: 52%	3: 4%	4: 26%	5: 13%
Create change in The University Administration	1: 8%	2: 49%	3: 13%	4: 22%	5: 8%
Create more effective faculty governance	1: 13%	2: 65%	3: 8%	4: 13%	5: 0%

The next organizational learning disability is called, "The Fixation On Events." We are conditioned to see life as a series of events, and we believe that for every event there is one obvious cause. Focusing on events leads to what is called "event" explanations. The participants were asked to think of something that recently happened in the Center that directly affected them. They were then asked to use the following rubric to describe how they felt about that event: 1. I know exactly what caused the event, 2. I have a basic understanding of the cause, 3. There were complex causes, but I understand them fairly well, 4. There were complex causes and I understood a few of them, 5. I have no clue to the real cause. Below are the results

Best describes how you feel about the event	1: 10%	2: 10%	3: 29%	4. 38%	5: 14%

The fifth learning disability is "The Parable of the Boiled Frog.". We as human beings will not avoid the same fate of the frog until we learn to slow down and see the gradual processes that often pose the greatest threats. The participants were asked to view the changes that have occurred in the Center over the past few years and asked to use the following rubric to describe their feelings: 1. I am not sure how the Center got where it is today, 2. I can identify certain changes in our organization that have resulted in the Center being where it is today, 3. I can identify two or three specific decisions that were made that resulted in the Center being where it is today, 4. I can pinpoint the exact decision that resulted in the Center being where it is today, 5. I have not been at the Center long enough to accurately answer this question. Below are the results:

Why the Center is where it is	1: 13%	2: 30%	3: 17%	4: 8%	5: 30%

The sixth learning disability is "The Delusion of Learning from Experience." When our actions have consequences beyond our learning horizon, it becomes impossible to learn from direct experience. Herein lies the core learning dilemma that confronts organizations. The participants were given the following statement: Having experienced the changes that have occurred in the Center in the past few years, which statement best describes how you feel. They were then given the following rubric: 1. I certainly learned from these experiences and now I know what to and not to do, 2. I now have a better understanding of the consequences of my decisions and have a basic understanding of what to and not to do, 3. The whole situation is so overwhelming I really don't care anymore, 4. I want to do something, but the organization of the Center is so complex that I am not sure I understand what to do or not to do, 5. I have not been part of the Center long enough to have an opinion. Below are the results:

How do you feel about the changes	1: 5%	2. 36%	3. 5%	4: 27%	5: 27%

The last organizational learning disability identified by Senge (1990) is "The Myth of the Management Team." This team is supposed to sort out the complex cross-functional issues that are critical to the

organization. The participants were given he lead statement: I feel that if we can ever get the proper administrative team in place. They were given the following choices: 1. They will begin to solve the problems of the Center, 2. They will create new plans that will begin improving the situation, 3. They will not solve the Center's problems because we are replacing one system of control with another, 4. The only way that they can begin to solve some of the issues of the Center is by listening to faculty, 5. The only way solutions can be found to the problems I see is for me to work closely with this Team. Below are the results:

Getting the proper administrative team in place	1: 4%	2: 4%	3: 17%	4: 40%	5. 35%

Summary

When asked to define themselves 92% of those surveyed defined themselves in terms of their position, not as a member of the Center. One of the symptoms of the learning disability "I am my position" is that individuals see themselves in a system over which they have little control. When the responses were analyzed it showed that the participants viewed themselves having a high degree of control over those things that involved directly the classroom. However, 48% felt they had little or no control over things that affected the Center as a whole. When it came to administrative decisions, 79% felt that they had little or no influence. A polarization of the faculty appeared when it came to the higher aspirations of the Center. This was shown when 45% felt that they did have the potential to influence achieving the Center mission, but 45% felt that they had little or no control. When evaluating the perception of the participants concerning "The enemy is out there," the results indicate when examining issues outside of the Center only 30% had the attitude that there was a external cause over which they had little influence. However, when it came to issues within the Center, 58% of the responses indicated that there was a perceived "enemy" that caused the problem. Concerning the disability of taking action against a perceived enemy, 57% of the participants believed that taking a proactive stance against issues outside the Center was a good idea. Within the Center, 72% felt like taking charge and being proactive against the perceived "enemy" was something that should happen. When it came to fixation on events, I am not sure the way the survey was written really addressed this issue. When the responses were tabulated, 49% gave responses that might indicate they were fixating on events, and 52% saw issues to be so complex that they could not fix on any particular event. Due to the gradual changes of the Center from a matrix system to a typical hierarchical college of education, faculty were more perceptive to the fact that slow changes are the biggest threat. Those that were aware that slow change is the biggest threat to an organization was 41%. Also, 41% thought that they could learn from experience and make better decisions in the future. The encouraging result centered around the myth of the administrative team. Only 8% felt that getting the right administrative team in place would solve many of the problems of the Center. A large majority, 75%, felt that the only way positive change was going to occur was if they themselves were involved in the solution. It is our feeling that this is the result of being involved in a system where each member of the faculty was a vital part Having experienced that capability, they have an insight that others who have not had that experience may not have.

The Center for Excellence in Education is a typical college of education today. This came about after having experiencing an organization that is very different. What we are observing is that we as an organization are moving farther and farther away from the concepts of a Learning Organization as described by Senge (1990). Senge (2000) in his new book *Schools That Learn: A Fifth Discipline Fieldbook for Educators, Parents, and Everyone Who Cares About Education*, states that "It is becoming clear that schools can be re-created, made vital, and sustainably renewed by fiat or command, and not by regulation, but by taking a learning orientation," (p. 5). The Center for Excellence in Education at one time was moving toward this learning orientation, but lost sight of its vision. What this study indicates is that we as an organization are more and more moving into a organizational learning disability mindset. It also indicates, that we have to potential to stop this deterioration if we only will.

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THE FACULTY RETREAT—A TOOL FOR TECHNOLOGY ENHANCEMENT AND TEAM BUILDING

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Abstract: Explore innovative methods to advance your program's technology initiative and staff development for all faculty—full-time and adjunct, on-campus and on-line.

One effective way to advance your program's technology initiative and enhance team building is through the use of a one-day faculty retreat. Most programs have several sections of its introductory courses, with a narrowing enrollment in upper level courses. It is important that there be uniformity in the standards and content of course offerings and that the National Educational Technology Standards for Students be incorporated into all courses, from the elementary to the advanced.

In advance of the retreat, participants are expected to read a great deal of material and come fully prepared, so that the time at the retreat can be used to maximum advantage. Also, select a location where small groups can break out and use technology, yet easily come together to share results.

Expected outcomes of the faculty retreat can include updated courses, new approaches to student assessment; a list of skill sets that each student should have when entering and exiting each course; and creating an on-line student tutorial. Working from the perspective of Standards and Goals, using NETS as a guide, participants work in small groups on updating each course.

Keeping courses updated is a primary concern for all technology programs and a key project to be accomplished at the retreat should course updating, especially if courses were designed before NETS. Participants should be grouped by the course they teach and, at the end of their session, share ways of up-dating and improving that course. A second key element should be to create a list of skills sets students need when entering and leaving courses. Third, a program should have standardized assessment techniques, especially when courses are offered in different teaching modes—on-campus, on-line, and off-campus. A sharing of these techniques helps faculty look at different ways of assessing student performance and enables the chair to set standards.

As far as team building, it is important that all the faculty—especially the adjuncts—understand the policies and procedures of the program, have access to all of the resources that are available to full-time faculty, and feel part of the team. Guest speakers should include those people who support and enhance the program, such as the directors of the library, academic computing, graduate study, and evening student services; deans; and, if possible, invite the president of the university to attend as well.

Minutes should be taken and shared with the participants. A program book is an excellent reinforcement tool, not only for those faculty who attend the workshop but also for those who teach on-line courses and live far distances. In addition, the program books serves as a readily available orientation tool when new faculty are hired.

Including adjuncts, especially those who teach on-line and off-campus, in faculty meetings is not a common occurrence, but it is a critical element in developing a department that is well-motivated and delivers a standard level of service.

During this presentation the audience will have an opportunity to plan a faculty retreat and write the agenda for the meeting.

TECHNOLOGY STAFF DEVELOPMENT AT AN URBAN PUBLIC UNIVERSITY

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Abstract: The Instruction and Technology Initiative at New Jersey City University, an Hispanic Serving Institution, was designed to increase the capacity of faculty to foster instructional innovation via educational technology, both within the University and to reach teachers on the local and the statewide level. The Initiative is designed to fuse technology education with the specific learning needs of students through one-to-one and small group faculty training, and that full-time personnel staff the Center, serving as in-house consultants to the faculty.

The Center, designed to give faculty a central place to work and share ideas with colleagues, consists of a centrally located lab complemented by smaller labs at two other sites on campus and houses state-of-the art instructional technology for faculty use. In addition to computer/multimedia workstations, the Center has interactive media equipment such as CD-ROMs, audio/video editing tools, CD-ROM writers, laser printers, presentation technology, scanners, laser discs, and digital photographic technology.

Key elements in this initiative that make it different from many others are that the Center is designed to fuse technology education with the specific learning needs of the NJCU student population through one-to-one and small group faculty training, and that full-time personnel staff the Center, serving as in-house consultants to the faculty. The Center curriculum has three components. The first is technology training, which includes Creating Multimedia-based Presentations for Classroom Instruction and Multimedia Equipment Training. Because most NJCU faculty, like those at so many other universities, were never formally trained in the field of education, yet are involved in teacher preparation, the second component is The National Educational Technology Standards and Its Integration into the NJ Core Curriculum. The third module is specialized workshops on The Cultural Aspects of Teaching/Learning Styles and The Learning Styles of Older Returning Students.

Faculty have the ability to create multimedia materials using a variety of delivery modes including CD-ROM media that students can view at home or in a lab. For both students who are using the campus data network as well as the students who access the resources from anywhere in the world via the Internet, faculty are able to utilize several methods of delivering interactive material via the World Wide Web and the Internet. Examples include: full motion video

segments, interactive quizzes that can be either practice or timed, live chat sessions with faculty to discuss problems without traveling to the campus, and the ability for the instructor to really see what the student is doing via collaborative technologies.

To insure that the technology is utilized to maximum advantage, the Instructional Technology Committee, made up of faculty selected from each of the three divisions, coordinates activities. Two full-time people are available support the faculty: the Multimedia Curriculum Specialist and the Multimedia Technician. The Multimedia Curriculum Specialist is responsible for training faculty in the "translation" of curriculum from traditional formats to multimedia format; evaluating currently available multimedia curricular materials and training faculty to conduct such evaluations; and facilitating faculty use of distance learning methods to deliver multimedia instruction. The Multimedia Technician is charged with ensuring that equipment operates properly and that faculty are trained on the equipment. The technician also oversees equipment installation, preventive maintenance, vendor liaison, software installations, and upgrades.

The Curriculum Specialist routinely conducts seminars on the integration of learning and technology as well as the needs and abilities of diverse and remote learners. These workshops illustrate to faculty how non-traditional, student-focused, interactive instruction helps multicultural students successfully learn and take an active interest in their education. In addition, the Center conducts small group and departmental work sessions to provide specific assistance to faculty to incorporate successful strategies into their courses.

As one of the original nine public colleges, New Jersey City University is the only institution that has remained in a densely populated urban setting. It serves students who, overwhelmingly, are the first generation of the family to seek a college education. It represents a path toward opportunity for an economically poor constituency, most of who are highly motivated, academically underprepared, and upwardly mobile.

During this presentation the audience will explore a range of alternative methods of using educational technology that have proven to be successful with diverse and under-prepared learners.

Faculty Training - Lessons in a "Flash"

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Abstract: This paper is an examination of current literature identifying factors affecting faculty use of technology for instruction. One of the key research findings identifies training as an essential element in the success of faculty use of technology. This paper describes one solution being evaluated by the faculty development center that has shown great potential for providing training to numerous full-time and adjunct faculty members who are widely dispersed on multiple campuses by delivering the training online.

Introduction

With ever-increasing demand from college administrators and students, faculty members are being encouraged to embrace technology as a way to increase the number of students served, improve the quality of their instruction, better prepare students for the workplace and reach students not previously served by traditional classroom instruction. This paper will examine factors reported in the literature as causes of college faculty reluctance to use technology as well as factors that help promote its increased use. The types of technology used by faculty for instructional purposes will also be reviewed.

While the use of technology is rapidly increasing in the business world, the use of technology in academia is still not widely accepted (Okpala & Okpala, 1997; Spotts & Bowman, 1995). With the need to expand the use of technology increasing, it is important for colleges and universities to recognize the critical issues that impede growth in the use of technology by instructors and address them if their goals are to be met. Identifying incentives and motivational factors that will help expand the use of technology by college faculty will be beneficial to institutions of higher education. Understanding the need for support systems will assist colleges and universities in planning for the infusion of technology in teaching.

This paper is not an exhaustive review of the literature but was prepared to establish a foundation for planning and implementing faculty and staff development programs in the use of technology as a tool for instruction. Understanding how faculty use technology, their concerns about technology and factors that help produce positive acceptance by faculty members are keys to successful instructional technology implementation and expansion projects.

Factors Negatively Affecting Use of Technology by Faculty

Several contributing factors were identified in the literature as causes of faculty reluctance to adopt technology. Among the most common reasons cited in these studies were factors related to deficiencies including lack of training, lack of support, lack of equipment, limited access to hardware and lack of funds (Spotts & Bowman, 1993; Roberts & Ferris, 1994; Okpala & Okpala, 1997; Novek, 1999; Dickson, 1999; Quick, 1999).

Other difficulties such as time requirements and availability of equipment were also identified as usage barriers. Spotts and Bowman (1993) found that over 50% of their 306 survey respondents reported that the time required to learn and use technology was the major contributing factor to its low level of acceptance by faculty. Quick (1999) also reported lack of time available to learn how to use technology as a major impediment to faculty use.

Novek (1999) reported that faculty in her study had several fears about the use of instructional technology. The first fear was about the devaluation of their role as instructors and possibly the loss of employment as technology use increased. A second concern expressed by the respondents was their fear that expanded use of technology in teaching would dehumanize the instructional experience for students and result in their alienation. Although most of their fears were related to the use of distance education technologies, the

faculty saw the increased use of technology as a threat to their livelihood. This perception of technology would certainly have a negative effect on their willingness to participate in its usage. College administrators must be sensitive to these concerns when considering the use of technology for distance education.

A faculty's attitude about the importance of technology in their instruction was another factor that seemed to determine the extent to which technology was used. Okpala & Okpala (1997) took a random sample of faculty members from three Historically Black Colleges and University Institutions in the South. Their study found that 38% of the respondents indicated that they felt technology was not important to their instruction. Most of the instructors in this group also indicated that they did not use instructional technology in their courses.

Positive Factors Influencing Use of Technology

Several of the studies identified important factors that influenced the faculty's positive attitude towards instructional technology. Equipment availability ranked highest in importance (Spotts & Bowman, 1993; Nantz & Lundgren, 1998; Groves & Zemel, 2000). Improved student learning was also ranked highly in importance. (Spotts & Bowman, 1993; Groves & Zemel, 2000).

Several other positive factors reported include funds to purchase materials, advantages over traditional methods of teaching, ease of use, compatibility with subject matter, release time to learn technology, and availability of training. These studies suggest that for a program designed to increase faculty use of technology to be successful, program developers must be sure that the technology is readily accessible. Time must be made available for faculty to experiment with the technology and training must be provided to support them in their efforts.

Dusick & Yildirim (2000) found a high positive correlation between ownership of a home computer and computer competency. The study also found that computer competency was a predictor of instructional use of computers. The researchers concluded that use of a computer by faculty at home has a positive effect on their use of computer technology for instructional purposes.

Faculty Use of Technology for Instruction

Several studies (Okpala & Okpala, 1997; Inman & Mayes, 1998; Taber, 1998; Groves & Zemel, 2000) reported on the types of technology used by college faculty. Understanding existing faculty use of technology is extremely important in planning training and staff development programs (Inman & Mayes, 1998).
All of the studies reviewed found faculty use of word processing and e-mail was common. Most also indicated that the use of multimedia and distance learning technologies was very low. Mitra, Steffendmeier, Lensmeier & Massoni (1999) found that the traditional use of computers for programming and data processing has shifted to the use of computers for communication.

Taber (1999) found the use of presentation software ranked very high (90% or higher) among the technologies used. Groves & Zemel (2000) also reported high (70%) usage of presentation software. This conflicts with the findings of Okpala & Okpala (1997) who reported low (12%) usage for presentation software. These differences, from data reported in different yet well designed research studies, illustrate the importance of understanding the distinct characteristics of the faculty needs in each college or university before embarking on development of technology training workshops.

Use of the Internet for instructional purposes ranked high in a number of the more recent studies (Inman & Mayes, 1998; Taber, 1999; Groves & Zemel, 2000). Older studies did not report such findings. Recent widespread expansions in Internet access at colleges and universities is the mostly explanation for the differences in the findings.

Inman & Mayes (1998) and Taber (1998) found frequent usage of computer-based instruction reported by their respondents while Groves & Zemel (2000) and Okpala & Okpala (1997) reported low usage of those technologies. These apparent conflicts in reported information reinforce the notion that a local needs analysis is critical to meaningful staff development planning.

Incentives for Faculty to Encourage Use of Technology

Learning to use new technology clearly takes time. Many of the studies found it was extremely important to provide incentives to faculty to make appropriate use of the available technologies for instruction

(Spotts & Bowman, 1993; Inman & Mayes, 1998; Nantz & Lundgren, 1998; Miller & Husmann, 1999; Taber, 1999; Padgett & Conceao-Runlee, 2000). As one might expect, monetary rewards, stipends, tenure and promotion credits, and release time were commonly reported incentives.

A very interesting finding about faculty motivation was uncovered in two of the studies. Spotts & Bowman (1993) found that the most frequently reported incentive for expanding the use of technology was evidence of improved student learning. Miller & Husmann (1999) found it was not external rewards such as merit pay or release time but internal rewards such as self-fulfillment and enjoyment of teaching that motivated faculty to participate in technology use. Respondents reported that observing increases in student motivation and student performance were more important incentives to increase the use of technology than were financial rewards to the faculty for participating in the use of technology.

The Role of Training

Faculty training is a critical component to successful integration of technology in higher education.

> The critical role of teachers in effective learning means that all must have training, preparation, and institutional support to successfully teach with technology .... Few teachers have had either teacher education or field experiences that enable them to be effective distance education teachers or successfully use technology in their own classroom. (Office of Technology Assessment, 1989, p.17)

Although the quote above is more than ten years old, the essence of its message has not significantly changed. In a recent survey of community colleges, Milliron and Leach (1997) reported that the training structures for developing the technology skills of faculty members are still not in place and yet training is viewed as an essential ingredient in keeping their faculty current.

The importance of understanding technology use and faculty needs in training is an extremely important issue in staff development planning.

> Assisting faculty in developing the skills and knowledge to make use of this technology will become a critical issue in program and faculty development. However, without research to determine what kinds of training and technology are in use and are needed at a particular college, university, or system, efforts to train faculty will not reach their full potential. (Inman & Mayes, 1999, p. 20)

For a staff development program to meet the needs of the faculty, it is critical that the trainers understand the specific type of technology being used by the faculty and what new technologies may also be useful. Inman & Mayes (1999) suggest that training programs must be designed to allow for multiple training experiences. They found that as faculty become more familiar with technology, their need for additional training in other technologies is likely to increase.

Inman & Mayes (1999) also suggested that there should be a distinct separation of general education and hardware training from advanced training in more sophisticated technologies. Dusick & Yildirim (2000) also found the need for separation of users and nonusers in training. Experienced users were focused on improving their existing skills through specific training. Nonusers preferred short personal training sessions or in small groups.

Dusick & Yildirim (2000) found that computer competency and prior computer instruction were significant predictors of the use of computers for instructional purposes by faculty. It is evident from the study that training is an important positive factor in expanding faculty use of computer technology.

Candiotti & Clarke (1998) and Dusick & Yildirim (2000) also found that support for faculty while they are learning new technology is critical. Both studies suggested that a modest investment in support staff yields far higher returns in increased faculty use.

The Problem

A major problem faced by the Center for Teaching and Learning with Technology was how do you train countless numbers of faculty members who are geographically dispersed on three main campuses and numerous remote satellite locations and all have conflicting time schedules. Several options were considered. The most obvious was to schedule training sessions at varying times and locations to try to accommodate the variety of needs of our faculty. This, of course, is time-consuming and expensive.

A Solution

Since one of the major goals of the Center is to encourage the use of technology by faculty to enhance teaching and learning and provide them with the support to make that happen, it was logical for the Center to investigate the use technology to help solve this problem. The College already had its own web servers and internet connections to the majority of faculty offices as well as to numerous locations throughout our campuses. So instead of bringing the faculty to a single location for training, it was decided to try to bring the training to the faculty through the internet wherever they are.

The first task was to identify what media elements would be necessary to do the most common types of training that faculty requested. Interactive video would certainly be helpful but production is expensive and time-consuming and was not really necessary for most applications. Video over the web is greatly improved but still problematic for most low-bandwidth users. Screen captures of program screens for demonstration purposes were useful in traditional instructor-led training sessions and certainly seemed appropriate for online delivery. Audio instructions also proved effective to support instruction. Animating illustrations of items such as pulldown menus, button selections, and other features was also desirable if they would not take a long time to develop.

Macromedia's Flash was selected as a primary online training development tool. It supported the media elements required by the Center for producing effective training tutorials online. Flash's built-in tutorials made learning to create media-rich, interactive instruction on the web fast and easy. Files sizes were lower than comparable HTML pages would have been so there are no long delays waiting for new images to appear. Audio tracks stream well even over low bandwidth connections. Reusable models were created to cut development time for new training projects. The latest version of Macromedia Flash even comes with a library of learning interactions that speed up the process of creating online training for faculty. Flash is supported by most of the common browsers.

Although at the time of this writing no significant data collection has taken place, anecdotal reports from faculty members who have used the online tutorials found them helpful and much more convenient than traditional instructor-led training sessions. A more formal evaluation is planned for the end of the semester.

Conclusions

Increasing college faculty use of instructional technology takes careful planning and ongoing support. Before a college or university undertakes a program to increase the use of technology, it is critical that factors which may cause faculty resistance to technology are identified. The research suggested that many of these negative factors are due to deficiencies that can often be overcome by careful advance planning and preparation.

Conditions that encourage faculty acceptance and use of technology must be in place for programs aimed at increasing technology integration to be successful. Availability and easy access to hardware and software are vital components of a successful technology expansion.

Ongoing training and support for faculty also plays a critical role in the expansion of technology use. Trainers must be aware of the types of technology that are available and those currently in use in order to create training programs that will be beneficial and relevant to faculty.

The use of the internet to provide training to faculty any time, in virtually any location, shows potential for solving a number of faculty training issues. A rapid development tool such as Macromedia Flash makes it possible to create web-based training applications without a prohibitive expenditure of time and effort.

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Justification of Technology Teacher Training From Human Performance Perspective

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Abstract: Technology teacher training is one of the most preferred methods in schools and other educational institutions to close the gap between teachers' expected level and current level of technology use in the classroom. The purpose of this paper is to investigate, based on Mager and Pipe's (1997) performance analysis model, if technology teacher training is the only solution to improve teachers' performance in using technology in the classroom. First, a literature review on technology teacher training will be provided and then the performance analysis model will be used to evaluate the necessity of the training.

Introduction

The literature has much information about different views on technology teacher training programs designed to improve teachers' performance in integrating computers into the classroom. However, human performance specialists advocate that training is not always the solution to tackle with low human performance. Non-instructional or management solutions would be applicable to certain situations (Rothwell&Kazanas, 1998).

The purpose of this paper is to investigate, based on Mager and Pipe's (1997) performance analysis model, if technology teacher training is the solution to improve teachers' performance in using technology in the classroom. First, a literature review on technology teacher training will be provided and then the performance analysis model will be used to evaluate the necessity of the training.

Literature Review

The literature indicates that lack of educational technology training prevents teachers from the use of computers in schools (Scheffler, 1997) and an appropriate training increases teachers' comfort level, enthusiasm, confidence and skills to use technology (McNamara, 1995). Hardy (1998) says that seven-year continuous training and experience are necessary to become a comfortable and confident user of educational technology. Of the seven years, teachers need five years to get used to the technology and then they start expending the use by adapting some computer applications, such as tutorial programs and drill and practice software.

Several training programs have been tried out and discussed by researchers. McNamara (1995) depicts a training program that is composed of three levels: Awareness, development of skills and applications of knowledge. In the awareness stage, the training focuses on basic knowledge about computers. After that, equipment operation and the use of computer applications should be taught. In the last stage, applications of knowledge, the main theme should be integrating computers into the curriculum and using the computer for classroom management.

In another approach, the training is designed such a way that teachers consecutively become technology assistant, technology teacher and technology leader. The technology assistant is capable of manipulating computer hardware and running computer applications at least with the help of the manuals. Technology teachers are able to evaluate educational software and integrate them into the curriculum without supervision. Technology leaders can use the technology with different pedagogical approaches, such as cooperative learning and constructivism, and use advanced multimedia and Internet applications (Guffey, 1998).

Siegel (1995) proposes a three-level teacher-training program. At the end of the first level, teachers become familiar to some specific hardware and software. During the second level, teachers learn evaluating educational software to implement in the classroom. In the last level, teachers become capable of producing ideas on the technology integration.

After training, teachers should gain several competencies important for the technology adaptation in education. Teachers should be a competent computer user (McNamara, 1995; Guffey, 1998; Siegel, 1995; Hardy, 1998; Walters, 1992, Willis, 1994). That includes understanding and operating of major computer parts such as monitor, modem and sound card as well as major computer peripherals including printer, scanner, cameras etc. Software competencies are installing and running operating systems, educational software and tool software, such as word-processing, spreadsheets, presentation and database (Guffey, 1998; Siegel, 1995; Willis, 1994)

Besides computer and software skills, teachers should be trained on the pedagogical issues and classroom management. Teachers have to be knowledgeable about instructional design models, integrating computers into the curriculum, computer assisted instruction and evaluating educational software to use in the classroom (McNamara, 1995; Forcheri, 1986; Siegel, 1995; Walters, 1992). Also, teachers are able to use the computer as a classroom management tool, such as keeping journals and reports about students and taking attendance (Hardy, 1998). Programming and Internet are other important competencies for teachers to learn (Becker, 1994)

The literature proposes the following tips and strategies to improve the effectiveness of a teacher training program: The training priority should be given to volunteer teachers; the training should be given by experienced classroom teachers or teacher trainers; the training should provide teachers with practical examples and extensive hands-on experiences with computers; the teachers should instantly use new technology skills in their classes; and teachers should be provided follow-up support after the training. (Heidi, 1999; McNamara, 1995; Wetze and et al, 1996; Siegel, 1995; Gilmore, 1995; Tally, 1995)

Technology Training and Teacher Performance

Are teachers really employing computers effectively in the classroom? Is there a difference between how they should utilize computers and how they are currently using them in the classroom? Those questions are concerning about teachers' performance to adapt computers into curriculum. Human performance technologists employ systematic models to identify deficits in human performance, investigate their causes and bring solutions.

Mager and Pipe's performance analysis flow chart can be used to investigate if training is necessary for teachers to successfully implement computer-based activities in classroom. The performance analysis flow diagram focuses on three issues: Identifying performance discrepancies and determining their importance, considering alternative solutions for those discrepancies and considering training solutions.

Teachers' Performance Discrepancy in the Use of Educational Technology

In the last 20 years, the numbers of computers have increased significantly in schools. However, significant percentage of new teachers has not used computers for instructional purposes (Wild, 1996; Hardy, 1998). On the other hand, even though some teachers try to adapt the computer in their lessons they are not able to achieve an appropriate integration (Dunn & Ridgway, 1991). Most of the time computers are employed in an unproductive manner and isolated from the classroom. For instance, they are substituted for paper-and-pencil individual worksheet activities and used as a tool to reward and punish students due to their behaviors (Becker, 1992). In high schools only 31 percent of the student computer time is devoted to

the support of academic subjects (Fostering the use of educational technology). So, "computers should be further integrated into the actual curriculum" (Heidi, 1999).

As can be seen from the information above, teachers do not utilize computers at the expected level. What are the consequences of teachers' performance gap in using technology in classroom? This is a controversial issue among educators. Some believe computers are not able to provide a significant improvement in students' learning (Cormack, 1995). On the contrary, it is advocated that well designed technology supported lessons are able to improve students' learning performance and decreases the learning time. Students' attitude towards learning is increased, as well (Dusic, 1998). Looking at the issue from educational system change perspective, Branson (1998) assigns an important role to technology to carry out the transition from current teaching-centered educational system, which is considered to reach its final efficiency limits and does not become better, to new learning-centered education system.

Training Solutions to Close the Gap

According to the Mager and Pipe's performance model training can be considered as an appropriate solution for low performance if one does not have enough job related knowledge and skills. In connection with this, if teachers have lack of the knowledge and skills to adapt technology in the classroom training can be helpful. So the question is "do deficits in the technology knowledge and skills prevent teachers from employing technology to teach?"

Walters (1992) indicates that only 20 percent of new teachers believe that they were prepared to use computers in instruction. Even though having positive attitude towards technology, very high percentage of teachers, around 90%, even is not confident about their computer literacy skills and knowledge (Dupagne, 1992). Moreover, student teachers do not know the basic computer skills and designing computer-supported lesson plans (Cormack, 1995). Usually, they have not been educated about and exposed to systematic ways to integrate technology during their educations because collages of education have not fully adapted technology courses into their programs, not met student-teachers' computer education need (Pugalee, 1998) and the faculties in those colleges lack the expertise in both technical and pedagogical skills in educational technology. (Hardy, 1998; Wild, 1996). This limits the prospective teachers' competencies and knowledge of integrating technology in the curriculum.

The information above coming from the technology teacher training literature apparently says teachers often lack the skills and knowledge in using technology. There is a considerable need to provide teachers with training in how to appropriately design and deliver instruction that incorporates technology (Pugalee, 1998). Usually exemplary computer using teachers work in school districts that heavily invest in staff development program and they have more formal training in using and teaching with the computer (Becker, 1994). Supporting this judgment, many technology experts agree that an ongoing barrier to implementing technology in schools continuous to be the lack of appropriate training for teachers (Hardy, 1998). If they are provided with time and support for in-service training they may gain positive attitudes towards technology and easily learn planning and using the computers, so that technology integration can be successfully achieved in school (Dupagne, 1992; Sheingold & Hadley, 1990).

Alternative Solutions

Technology teacher training, alone, is not capable of solving the multidimensional problems related to technology integration in education. Besides the training need there are several other obstacles preventing teachers from successfully using technology to teach. Mager and Pipe in their performance analysis flowchart first systematically examine alternative solutions to training. They consider four factors that may cause low performance: Unclear performance expectations, inadequate resources and feedback, punishing desired performance and rewarding poor performance.

As far as clear expectations are concerned, the technology integration is still a vague concept. Having done many studies about technology and education, researchers have failed to put out common, concrete and practical criteria with regard to the best ways of using computers in classroom and teachers are not provided with clear-cut expectations to successfully implement the technology.

In spite of big investment in purchasing hardware and software in schools, even more than the amount spent for the staff training and professional development, teachers complain about inadequacy of

technology equipment and resources. There might be several reasons of that: The current average computer/student ratio (even though increased significantly in the recent years to 1/9) might be still a low proportion; many broken and malfunctioning computers are sitting in classrooms or computer labs due to lack of technical support; and the compatibility between new and old technologies is lost due to the rapid growth in the computer technology. Old computers do not support new versions of software and hardware. The last two reasons may indicate that, even though significant number of computers appears in the inventories of schools they are practically not useable. (Wetzel and et al, 1996)

Feedback is an important mechanism to improve human performance. Behaviorist psychologists have done significant number of research on feedback and how to provide it and when. However, the educational technology literature lacks information about how effective feedbacks should be provided with teachers upon their technology integration practices in the classroom and who should do it. Technology coordinators would do that but few schools have fulltime technology coordinators and they are overloaded with many different tasks including teaching computer literacy, maintaining computer lab etc. Basically, they are not able to allocate time to observe and provide feedback for the teachers.

One of the most controversial issues in education is student evaluation. In many states, students are required to take standardized performance tests and teachers are held accountable for the students' scores. Researchers indicate that different learning processes require different evaluation procedures. For instance, standardized tests are usually associated with instructivist /behaviorist type of teaching. Yet, the literature shows that teachers prefer to use technology in a more student-centered/constructivist way that is not properly evaluated by performance tests. So, evaluating computer-supported instruction through an inappropriate means and holding computer-using teachers accountable for students' low scores based on an inappropriate evaluation technique would be punishing the computer-using teachers as well as rewording the non-computer using teachers because their students have a greater chance to show better performance on standardized tests.

Conclusion

According to the literature, teachers do not have enough competencies to integrate computers in the classroom and they do not get sufficient in-service training. Pre-service teachers also graduate from colleges of education with a very little exposure to and knowledge about educational technology. There is a substantial need to provide teachers with educational technology training.

However, the training should not be considered alone. Teachers have to be provided with additional assistants such as job aids and EPSS supporting the training. Moreover, there is a need to develop a school/district (or broader) level system or policy that coordinate and manage the technology integration and implementations in schools. This system or policy should define what is expected from educational technology and how it will be judged, how teachers have to employ technology in classroom, what technology and non-technology resources will be available for teachers and what incentives will be given to them.

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Increasing the Use of Computers in Early Childhood Teacher Education: Psychological Factors and Developmental Appropriateness

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Abstract: This paper examines the case of one urban early childhood teacher educator's increasing use of computers in early childhood (PK-3) curriculum courses, over a period of one year. The paper describes the both the obstacles to such increased computer use and the factors related to this increasing integration of computers. The case is analyzed from the perspective of the early childhood concept of developmental appropriateness, and with respect to the motivation and learning required of the teacher educator.

Data

Data for the case included the teacher educators' reflective journal entries, and descriptions of the integration of computers into class activities and student assignments. Data also included reflections on the course activities in which computers, early childhood software, and net searches were integrated into the course.

Obstacles to Increasing Computer Use

There were numerous obstacles to either any increased utilization of computers for instruction, or increased attention in the courses to issues of computer use in early childhood education. These included obstacles often found in teacher education--the teacher educator's modest computer skills and lack of knowledge of current uses of computers in schools. One more area-specific obstacle was the teacher educator's set of concerns about the developmental appropriateness of computer use in early childhood education. However, the most significant obstacles seem to have been psychological--the teacher educator's ambivalence about increased use of computers, related to various psychological and technical obstacles to using computers in his urban teacher education setting.

Factors Underlying Increased Computer Use

The factors underlying success in increasing computer use included the availability of a second grade teacher who modeled successful use of computers in her classroom. Important in this case was the fact that this teacher's utilization of technology was not overly complex in nature, and seemed within reach of the teacher educator's own level of computer skill. Another factor was the public expectation that the teacher educator would at least give increased computer use a chance, as part of his involvement in a technology grant. An important aspect of this motivating influence was the degree of flexibility afforded the

teacher educator in terms of how computers or other technology were expected to be used. A third factor was adequate technical support at the university. However, the most significant factors seem to have been psychological. These included the teacher educators' reinterpretation of three things--his modest use of computers in instruction, his own relationship to technology, and his feelings of teacher efficacy regarding using computers in his teaching.

Analysis and Discussion

From the perspective of early childhood teacher education, this case reveals in greater depth some of the concerns about the developmental appropriateness of computers in classrooms for very young children. However, it balances these concerns with the teacher educator's discovery of evidence of some of the developmental benefits of such computer use.

The case was analyzed using three important aspects of motivation theory--teacher efficacy, self-regulation, and achievement goal theory. In particular, the adoption of a particular alternative perspective on teacher effectiveness helped the teacher educator persist in attempts at increased computer use. This alternative conception, which differs from traditional conceptions of teacher efficacy, was used by the teacher educator for self-regulation of his own motivation and learning. In turn, this alternative perspective of teacher efficacy was only possible by adopting the kind of "learning orientation" discussed in goal theory.

The case study presented here does not represent a case of exemplary computer use in teacher education. Indeed, the discussion of the case stresses the importance that less-than-exemplary models have for the success of any changes in schools and teacher education--whether that change is integration of technology or any other reforms. These points are discussed in light of the research by Zimmerman, Bandura and others on mastery models versus coping models.

Educational Significance

This case is significant because it is one example of what is necessary for widespread increases in the integration of computers and technology into teacher education. That is, it represents one pathway for gradual, incremental increases in computer use among somewhat skeptical teacher educators with only modest technology skills. In doing so, it highlights crucial psychological processes for supporting teacher educators' learning about and use of computers in instruction, especially for teacher educators who are <u>not</u> at the cutting edge of technology use.

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From Theory to Practice - Practical Use of Classroom Technology

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Abstract: The 21st Century is here. This brings new opportunities and challenges as businesses seek more technology skills for their future labor force. At the same time groups are looking at the welfare young child and call for reductions of computer time. Teachers find themselves in the middle of the 21st century needs and the issues around standards, assessment and developmental levels of children. This is often interpreted as a need to do an either or approach. The technology pyramid, multi-media planning guide and rubrics demonstrate ways for the teacher to provide for the needs of all of the groups with a balanced approach thus meeting the needs of all learners.

Introduction

In October of 2000 the Alliance for Childhood presented a report called, "Fool's Gold: A Critical Look at Computers in Childhood" (Cordes, 2000). The report takes educators, curriculum developers, and technology advocates to task concerning the use of technology at the elementary school level. The authors mention their concern for the health of our children, the lack of positive personal connections between children and adults, the lack of physical play and activity to which technology contribute, and the lack of stimulation brought about by using technology in the classroom (Cordes, 2000).

Advocates of student use of technology might find these concerns over reactive (Vaille, J., 2000) (Thornburg, 2000). Technology supportive educators would talk about the child's motivation to learn using computers. Educators would answer that if kids are sitting in front of computers six hours a day this report should be focusing on parenting and not on the educational system. (Schmidt, 2000) "Fool's Gold" poses questions which educators, must examine thoroughly if we are to make the educational experience of our students one in which the whole child grows in a proper developmental manner.

Early childhood educators, parents, and technology advocates can meet learning needs and help the young child grow in an appropriate developmental manner while using technology. If that is to happen, however, the adults must continue their learning and understanding in applying the concepts of learning theory to the proper use of technology in the classroom. Learning theories brought to educators by Piaget, Hunter, Bloom, and McCarthy need to be explored and applied if we hope to use technology in a manner that is conducive to constructivist education.

Learners of all ages need experiences that will prepare them for their future. This means different activities and opportunities based on student readiness and abilities. Learning theories developed to assist teachers in the delivery of a curriculum. In 1956, Benjamin Bloom first shared one theory still quoted by educators today. Bloom's Taxonomy of Critical Thinking and Problem Solving focused on the cognitive domain (Allen, 1998). Bloom's Taxonomy placed a ranking on the types of questions and learning opportunities asked of the learner. The lowest level considered factual recall. The difficulty rises with each of the six levels ending with evaluation. To assist the educator in identifying the level or developing questions for a specific level of difficulty collections of verbs provide assistance (Lane, 2000).

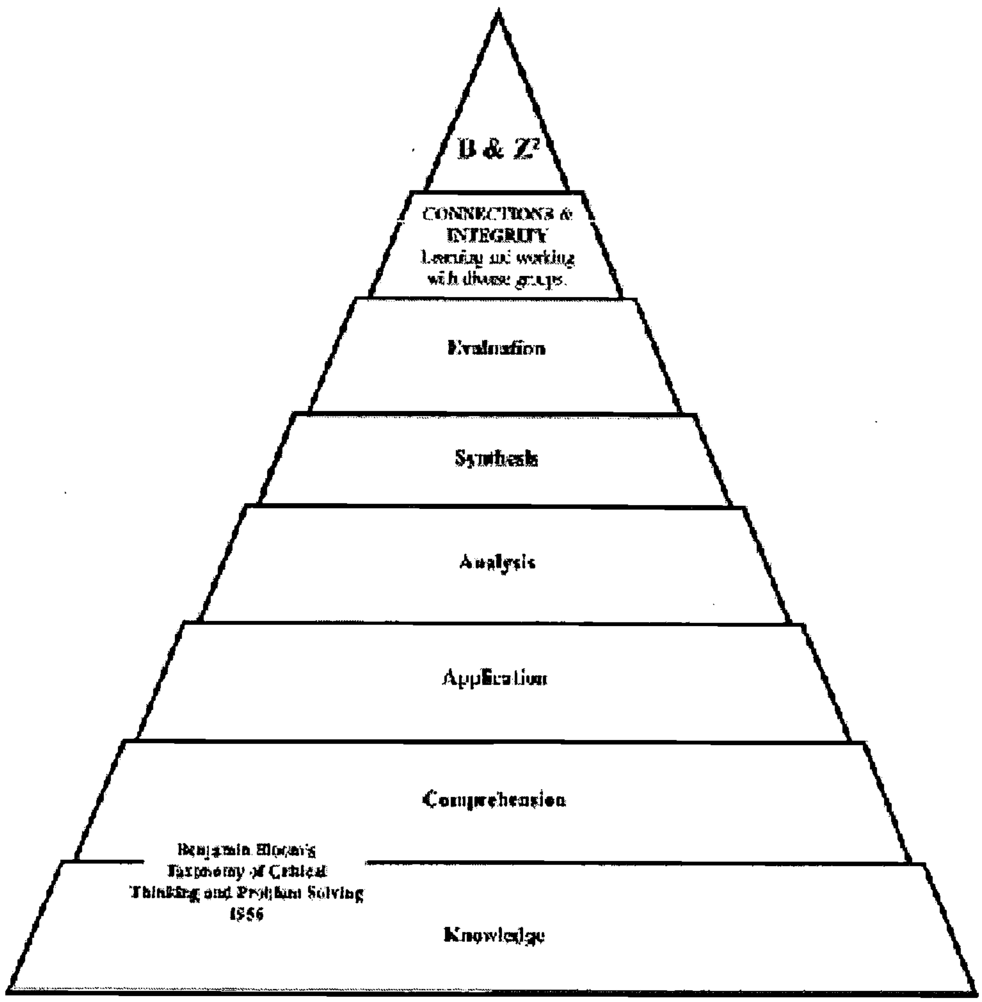

Figure 1, Benjamin Bloom's Taxonomy of Critical Thinking and Problem Solving with B & $Z^{2'}$ added level of Connections and Integrity.

The pyramid represents Bloom's Taxonomy (Burch, Ziegler & Ziegler, 2000). Fig. 1 Common practice in schools places the most time to the lowest levels with decreasing time spent on each of the higher levels. The B & Z^2 pyramid adds another level onto the taxonomy. The "Connections and Integrity" level seeks to identify the thinking needed to understand self and to work with diverse groups.

Madeline Hunter presented a Direct Instruction Model in 1967. Hunter's work eventually became know as ITIP - Instructional Theory Into Practice. Hunter's first model identified 9 steps that may be included in an effective lesson (Allen, 1998). The Hunter Model continues to be identified as a planning tool for developing lesson plans and supervision of instruction (Wolf, 1987).

Efforts such as Bernice McCarthy's 4Mat (Butler et al., 1997) and the Cooperative Teaching Model (Johnson, D., Johnson, R., 2000) are additional educational models seeking to improve learning opportunities for students.

These models, in combination with other education research seek to enhance delivery of instruction with the purpose of providing more effective learning experiences for students. With the advent of the personal computer in 1978, educators faced new opportunities and challenges. Computers continue to accelerate in speed and memory capacity while the cost continues to decline (Yang, 2000). Software continues to change at an alarming rate. Students and teachers can now edit full motion video on a desktop computer with titles and special affects galore (Steinberg, 2000). The Internet moved from a system of connecting through e-mail into a World Wide Web full of information that once only the most learned in the largest cities could access. These factors bring are changing learning opportunities.

Studies are show advances in student learning. Katie Herrick summarizes nine articles and reinforces the importance of using word processing constructively (Herrick, 2000). Experiences such as Australia Quest are taking students across the world to experience and problem solve issues that previously were only viewed by a handful of explores and researchers (Buettner, 2000). The world is expanding for learners of all ages.

Unfortunately, the benefits of these advancements are not enjoyed by all. A "digital divide" exists (Milken, 1998 & Lemke, 1999) that is preventing students from accessing these experiences. The present divide results from lack of access to the technology and the mindset of the teachers in the classroom. The department of labor observed this concern in 1991. The Secretary's Commission on Achieving Necessary Skills (SCANS) called on the American educational system, from pre- school through post-graduate, to attend to the responsibilities graduates assume as workers, parents, and citizens. Asserting that there is more to life than earning a living, SCANS also insisted that the following set of foundation skills and competencies are essential for all in the modern world. (United States Department of Labor, 1992)

Two additional models help show where the students are functioning as they use technology. The Technology Hierarchy, developed by Nancy Sculla, (Sculla, 1999) shows levels of technology use and complexity. The NETS project by International Society for Technology Education (ISTE) identifies levels of competency for students. A Nebraska Department of Education task force aligned Nebraska competencies with the NETS project. Both of these models can be adapted and applied to Blooms taxonomy. Again, the B & Z^2 pyramid adds another level onto the taxonomy. The "Connections and Integrity" level seeks to identify the thinking needed to understand self and to work with diverse groups. Fig 2

Figure 2. Technology standards for students as developed in 1998 with the Nebraska Student Essential Learnings & Technology (1999) matched to the six levels of Bloom's Taxonomy. At the top of the pyramid is the B & Z 2 level for Connections and Integrity

In a time when groups are concerned about lack of interaction with other children and/or meaningful adults, the Connections and Integrity level becomes of crucial importance. When a person knows who they are, they are more willing to reach out and meet or work with someone else. Integrity is knowing personal values and matching behavior to those values. Integrity is important for students to allow them the understanding that they have something to offer to others and to gain from others. Thus the effort to identify their multiple intelligences and provide them with life skills in the form of a value system such as the Eight Keys of Excellence (DePorter, Reardon, & Singer-Nourie, 1999).

QuickTime™ and a
GIF decompressor
are needed to see this picture.

Connections can occur using technology. E-mail, video-conferencing, web pages and cooperative projects using programs such as iMovie and HyperStudio allow for connections and interactions to occur. Consider one such technology opportunity. Under the direction of Nancy Bellows, Judy Brumbaugh, Tricia Hirschfeld and Kym Lucas, fifth students from York Elementary School, York, Nebraska, created connections each week as the fifth grade students, School News 2000. This 15 minute broadcast featured school events, classes, books, staff members and numerous topics of interest. Along with learning and applying basic skills, the fifth graders problem solved, worked in cooperative groups and extended themselves to apply traditional classroom skills to a real world activity of broadcasting. (Bellows, Brumbaugh, Hirschfeld and Lucas, 2000). Students of all grade levels looked forward to the production and airing of these weekly shows. This simple multimedia activity generated connections and a feeling of community for the entire school. While the computer, VCR, TVs, digital camera and iMovie made this possible, the real success of this activity came from the students identifying and using their skills while connecting with students throughout the school. These types of opportunities empower the learner and prepare them for life in their future.

Activities such as School News 2000 are possible in many schools. Lacking for many teachers are tools to help them plan and manage the development of the multi-media activity and an effective way to assess the final product. Tools such as the multi-media planning guide divide

the project into manageable steps for the student, teacher and parent (Burch, Ziegler & Ziegler, 2000). With dates and check off boxes to track progress. Along with the planning guide are age appropriate rubrics to help the students know what they can strive to accomplish and their product will be measured.

Opportunities to prepare students for their future are a necessity. Congress recently authorized the 21st Century Workforce Commission. In June of 2000, this commission released their findings. Their conclusions began with, " The current and future health of America's 21st Century Economy depends directly on how broadly and how deeply Americans reach a new level of literacy – "21st Century Literacy" – that includes strong academic skills, thinking, reasoning, teamwork skills and proficiency in using technology. Educators have a challenge to move beyond TTWWADI (That's the way we've always done it) syndrome (Jukes, 2000). It is time to prepare students for their future rather than our past. We must look to the developmental needs of the learner. Determine ways appropriate use and selection of technology that move the students up the levels of Bloom's Taxonomy for Critical Thinking and Problem Solving. Finally, we must provide teachers with resources to help them access how they are teaching and what they can do to become a more affective teacher in this 21st century world.

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